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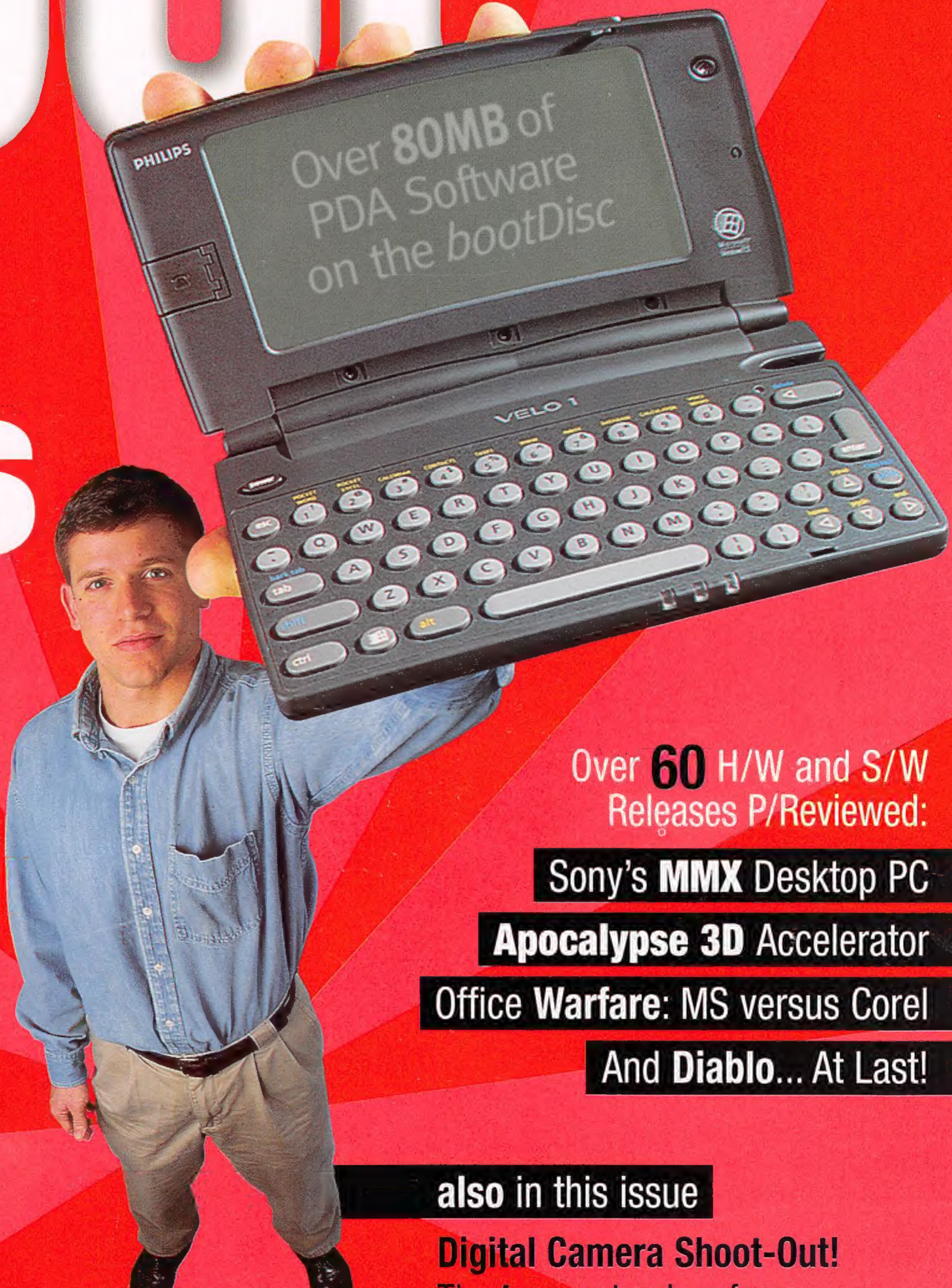

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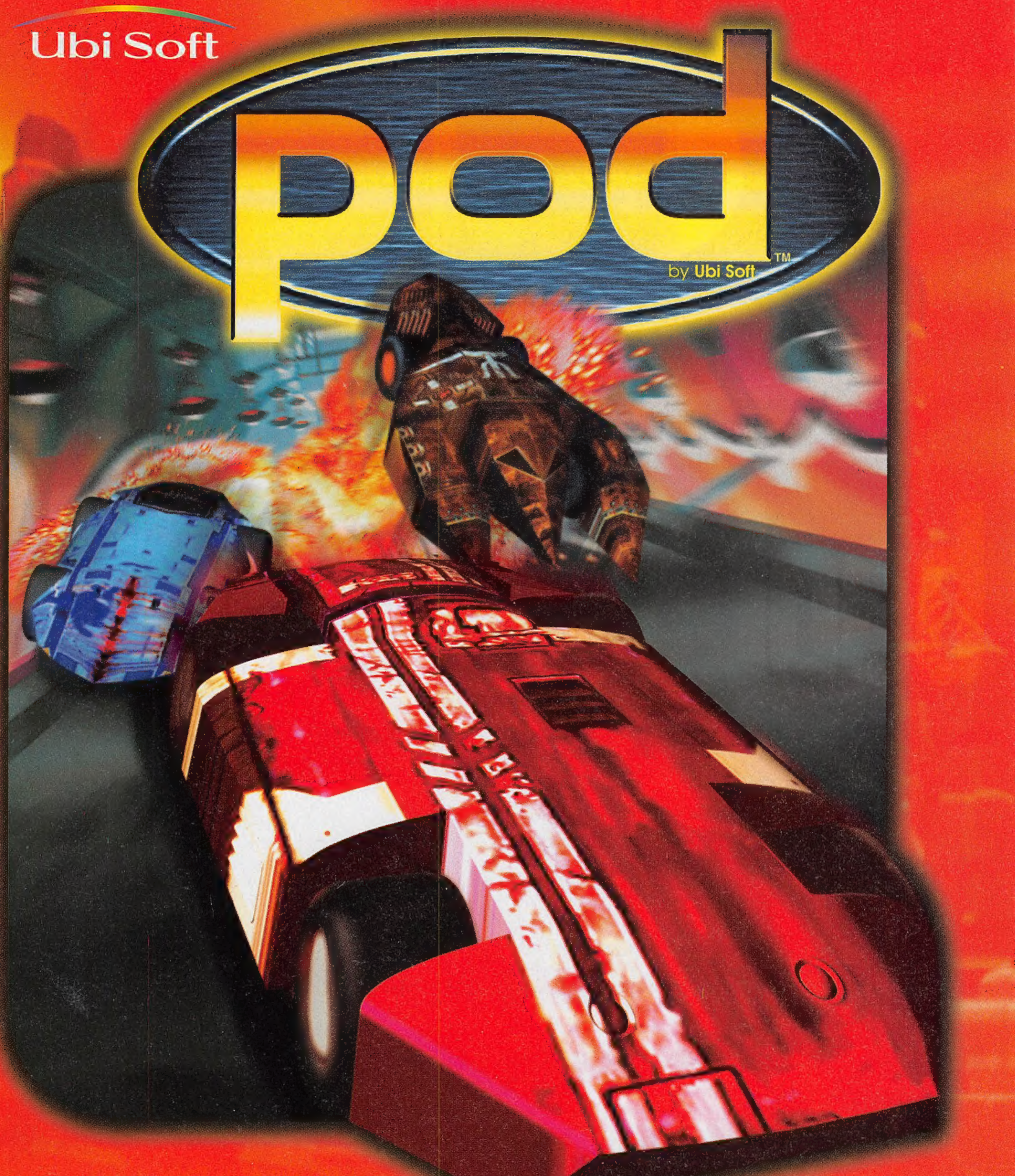

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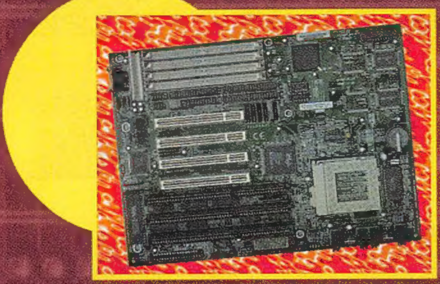

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36 Digital Camera Shoot Out

There's a new breed of digital camera shooting up the town and each is gunning to be the top gun. We took the latest from Olympus, Sony, Canon, Casio, Agfa, and Kodak out into the field and pitted them nose-to-nose. Check out the carnage and declare a winner.

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There may be lots of fish in the pond, but when it comes to Silicon Valley, Intel *is* the pond.

Come swim with

Mike Aymar

general manager of Intel's desktop division as he discusses the latest breakthroughs in technology, architecture, and connectivity, and reveals just what exactly is *inside* Intel.

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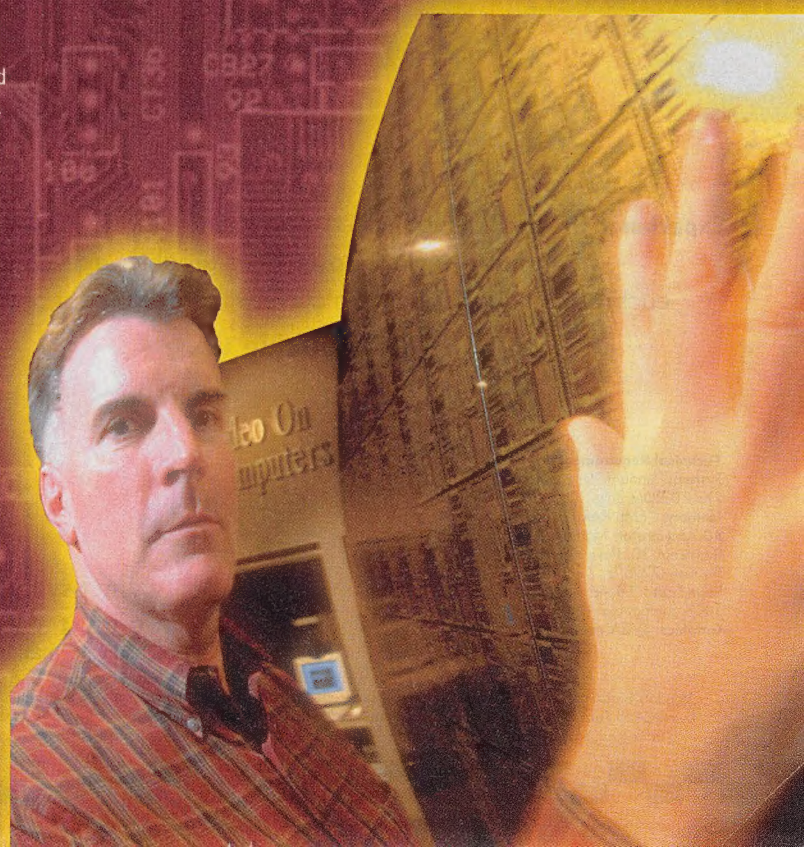
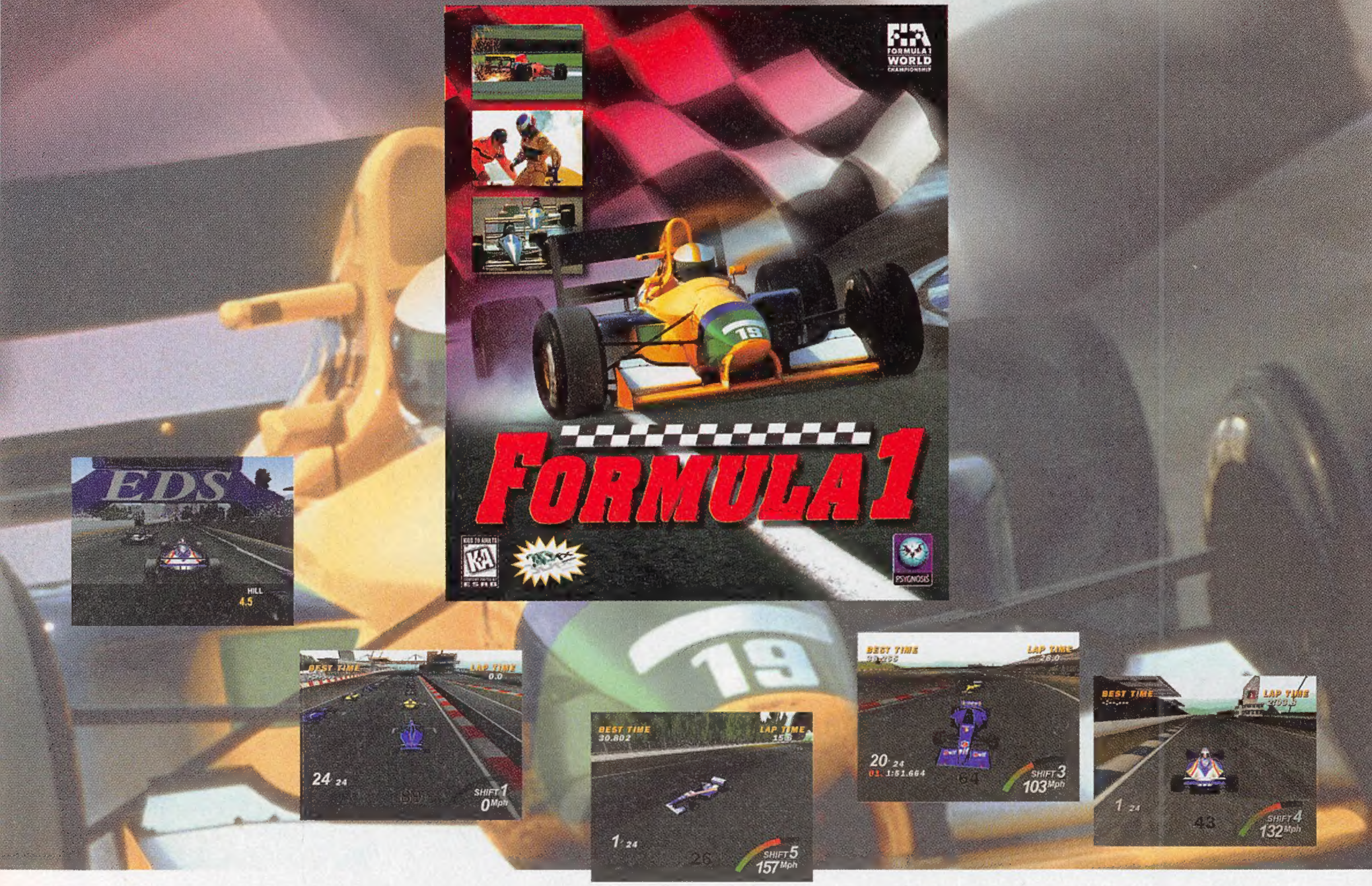
44 The abcs of PDAs and HPCs

Old guard PDAs were little more than electronic rolodexes with a built-in calculator. Microsoft's new Windows CE now makes it possible to raise the expectation level and finally call these pocket-sized wonders "Handheld PCs."



FORMULA 1

All Adrenaline, No Exhaust



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april 1997

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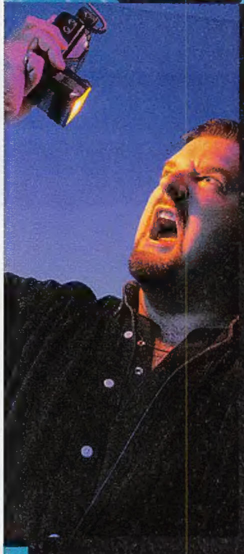
EDITOR'S WORDS



Can't we all just get along?

Occasionally, among the droves of love letters and pleas for the inside scoop, we receive mail like this:

"It has been a while since I messed with DOS configuration files, but I suspect your advice in the feature "Tighten, Trim, and Tuck Your PC into Fighting Shape!" (page 51 of boot 06) is completely wrong. In fact, it suggests that you don't know what you're talking about. The line you recommend: C:\WINDOWS\SMARTDRV 1024 2048 to extend memory to 1MB to DOS and 2MB to Windows will actually set a cache size of 1024k minimum and 2048k maximum, not 1024 in DOS and 2048 in Windows 3x. There is no way that a DOS config. parameter can have a different effect in Win3x. You seem to forget (and many people do) that the earlier versions of Windows were environments or sophisticated shells, not operating systems.

This edition was the first of yours that I tried. There's a lot of hype, but not much thought. I don't think I'll bother again."

Our knee-jerk reaction is to fire back a defensive retort and put those who dare question our PC might in their place. But that's how flame wars start. We have an informal policy here at *boot* to prevent this kind of heat. Someone blasts us, we reply (hopefully in a civil tongue), they fire back, end of story.

It's one thing when both sides are sharing knowledge toward a solution that will ultimately help everyone who shares the love for all things PC. It's an entirely different thing when that information is coated in silly taunts and put-downs. Instead of fostering cooperation, it encourages hostility. It is a byproduct of the insecurity that plagues us all in this overwhelmingly fast-paced realm.

We try to personally reply to every piece of e-mail that comes to us (as that number approaches landslide proportions, this is becoming increasingly difficult), but a sure way to avoid receiving a reply is to veil your point or question in a shallow threat or challenge. This isn't grade school and "daring" us doesn't work.

Admittedly, this type of antagonism represents the smallest fraction of letters we receive. But the issue is much more broad.

We've all had the experience of going into a computer store where the guys behind the counter lord over their supposedly inferior customers, snickering at their naive question; or visiting an office where the resident tech gurus feel nothing but contempt for those who aren't at their level. This malice manifests itself in under-the-breath quips, intentionally jargon-riddled comments, and straight-up belittlement. The whole mentality is reminiscent of the Old West where every gunslinger had to prove he was faster on the draw than the next guy. These romanticized notions don't take into account all the casualties that showdowns left behind. And today, we need to keep in mind all the uninitiated that are kept from the "exclusive club" of PC users by the bad attitudes behind such comments.

Let's not forget, all of us were once newbies. Everyone had to be shown how a mouse operated, what a command line consisted of, how to install SIMMs, etc. We ran the gauntlet of less-than-cooperative tech snobs; now let's break the cycle of abuse.

Imagine how much more powerful the PC could be if we all worked together.

I'm no namby-pamby New-Age nut case. I'll rip you a new one in a *Quake* deathmatch if I ever run across you on *Kali* and don't even expect mercy in an *F-22 Lightning II* dogfight. But there's a time and a place for competition, and it isn't when someone's just trying to learn and enter the world of computers.

btw: SMARTDRV [/X] [[drive[+|-]]...] [InitCacheSize [WinCacheSize]] [/E:ElementSize] [/B:BufferSize]

MANIFESTO OF THE NEW 3D REALITY

A movement is brewing. And with its birth, the PowerVR architecture begins the awesome struggle against conventional 3D; and against the techno-bourgeoisie who attempt to enslave the gamer masses. These ~~manipulative~~ technologists are turning their machines of propaganda against GAMERS, desperately trying to make them believe that their 3D performance is good enough.

Well, it is not! This naked, ~~shameless~~ exploitation of gamers has gone on far too long. Rise up! For we have created the ultimate instrument of change: the PowerVR technology. And we declare that the true console game experience on the PC will be our domain.

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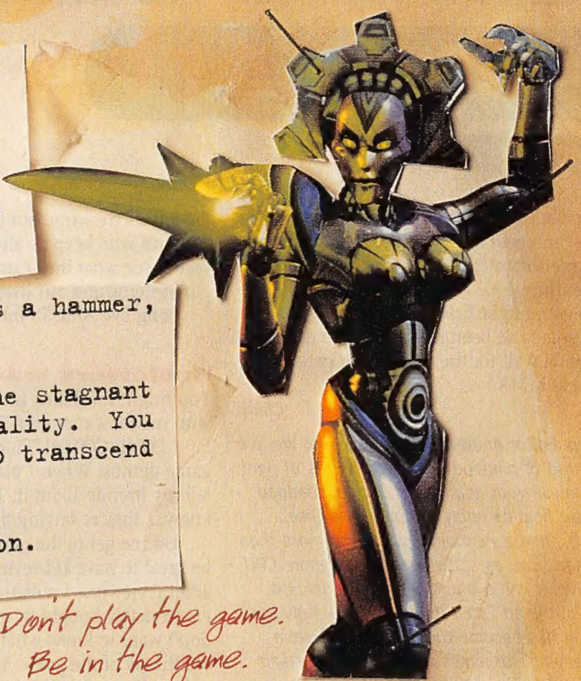

Don't play the game.
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The world's leading computer makers are building a PowerVR future. More are quickly joining the Movement. You'll know they're one of us if they flash the PowerVR Ready sign.

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commport

LETTERS TO THE EDITORS

Klamath cometh

God, I can't wait for Klamath! Does the average gamer or Internet surfer need the power of a Pentium Pro? Are the games of the future going to be driven by Pentium Pro processors? I've been having trouble deciding if I should wait for the Klamath or get a 200MHz MMX.

Chuck

Reviews Editor Andrew Sanchez replies: *We live in a world of planned obsolescence. As of right now, unless your application uses a boatload of 32-bit floating-point computations (like...* Quake!*), then a Pentium Pro may be more than you need. But, as software becomes more CPU-intensive, it will eventually push the current "state-of-the-art" past its limits. Look how the Pentium has become the "minimum system requirement" for almost every game released during 1996. The P200 MMX will soon become the gaming standard, and as the newer 233MHz and the faster P55C make their appearance, it's only going to get worse.*

Eventually, all games will require a Pentium Pro—but not right now. If you really want to be the big cheese on the block, wait for Klamath, but expect to pay some serious money. Right now, the P200 MMX is excellent.

DOS is dead! Long live DOS!

I enjoy your magazine, except for the interview with Alex St. John (Lip, *boot* 06). This man doesn't know what he's talking about.

DOS will never die as long as Win95 is alive. Look closely at how Win95 boots up. It uses the MSDOS.SYS and IO.SYS files from MS-DOS. This means DOS is still alive and will be until a wholesale switch is made to NT or Unix (or something like it).

"I love Win95, for exactly the reason most people hate it. You can't tweak it unless you know how."

Forget about DirectX. If DOS is dead, so is DirectX! Until Microsoft comes up with a better version of Win95 (or at least admits that Win95 is one big bug), there isn't much the average user can do with this form of development.

This overweight slob thinks people still using DOS are stupid fools! I understand freedom of speech, but don't try to tell me that I'm the wrong type of person, just because I like something that you don't!

Jay Harman

As I read the Alex St. John interview, I began to understand why Microsoft wants and needs radicals like him. Knowing what we want is a primary key to the success of any technology producer who wants to advance and succeed. Getting that information to the ivory towers is not done through the public or the letters we write, but by Alex and people like him who keep us all on the edge of our seat to see what they can do next to improve our systems and our lives!

Long live Alex St. John!

John Shadley

Reviewers wanted (?)

You might think this is a dumb idea, but bear with me for a moment...

I LOVE COMPUTER GAMES! I love new game demos. When I play a great demo, I tell my friends about it. The next thing you know.... they're buying the game.

Let me get to the point. I think it would be great to have kid reviewers instead of just adult reviewers. I mean, 70 percent of games are probably bought by kids or are for kids. I don't want to know what some 25- to 55-year-old thinks of the game, I want to know what a 10- to 15-year-old thinks of the game. I've bought games that got great reviews but then, it's like, "Gee whiz, this sure is a barrel of monkeys."

While I personally cannot write a good magazine article, I could tell a writer what I thought of the game and have them write the article.

Dan Rippey

Editor in Chief Brad Dosland replies: *Hey Dan, we always want to know what our readers think of the software and hardware we cover... no matter their age. And you'd be surprised by how many adults buy "games" and just how our 25- to 55-year-old reviewers can slip into a 10- to 15-year-old's mindset when reviewing a game, or sneak off to the arcade for lunch hour, or play practical jokes on other staffers... Hey, we're still trying to get the Magic Marker happy face off Dunphy's butt.*

The good life for those who know DOS

In response to Space Cowboy's letter in *boot* 05, I still see a command line every time I boot, but only because I refuse to run Win95 on a 486. I'll get it, but not until my Pentium Pro is built.

I love Win95, for exactly the reason most people hate it. You can't tweak it unless you know how, and it's creating an entire generation of people who say "What's DOS?"

These people will pay through the nose for people like me to come resolve their little compatibility problems. Life is GOOD!

As for Caesar Snee's letter in the same issue, OF COURSE this mag focuses on technonerds, it never claimed to do anything else. That's who it's written for and I hope it never changes. If I want lighthearted generic reviews, I can pick up any one of a hundred assorted tech rags; if I want the straight dope, I come to *boot*.

Milk and cookies, and a shot of gin

You almost break your arms patting yourselves on the back and billing yourselves as the magazine for power users, and then you devote half a page to a review of *Toonstruck*.

I enjoy your magazine a lot—don't let it go to the dogs. If somebody wants their milk and cookies send them down the road to the cadre of already lame computer mags that are infested with kiddie-software review termites and *Uninstaller* reviews.

Cork Kyle

News Editor Bryan Del Rizzo replies: *Hmmm... I take it you didn't like* Toonstruck? *I wouldn't classify* Toonstruck *as a kids' game (especially given the adult content), and the technical achievements in creating the game were more than enough to warrant a review.*

The bootDisc is phat

The *bootDisc* is incredible. The discs I'm used to getting with other magazines usually contain less than 150MB of nothing but game demos. The utilities you included on *bootDisc* 06 were worth the whole cost of my subscription.

I particularly liked *E-mail Ferret*—that one helped me find a high-school buddy I hadn't talked to in ages.

Marlon Martinez

The bootDisc is flat

Thanks again for your great mag, I would be more than willing to fill out some kind of survey that your ad guys could use to impress potential advertisers.

But where is the *Internet FastFind* reviewed in *boot* 06? I couldn't find it on the *bootDisc* or at your site. I couldn't even find any mention of it at Symantec's web site. Either it's not there or I'm really going brain-dead.

Paul McPeak

Associate Disc Editor Sean Cleveland replies: *You're not going brain-dead, although we may be flat lining. For reasons which we cannot recall, the software was not linked to the interface. The demo can be found in the directory* \ifftrial *off the root of the* bootDisc.

Instead of a survey, how about casting your vote in the first annual bootie *Awards? Information can be found on page 12 of this issue.*

CD-R promises and broken hearts

The CD-R feature ("CD-R 4 Everyone," *boot* 06) didn't review many of the CD-R drives currently available, namely the Yamaha CDR100 or CDR102. Also left out was the Philips CDD2000 and the Hewlett-Packard version of the Philips, the HP4020i. Could you enlighten me as to how you chose the drives you reviewed?

In the same issue, the article "CD-R Speeds Up," (bootWire) you write that Yamaha was slated to deliver a 4x6 CD-R in February '97. Yet, Yamaha has always had a 4x writer, the Yamaha CDR100 (albeit it a 4x4). Moreover, 4x writing has been around for a while. I thought that Yamaha was really speeding things up with a 6x6, which they showed at their Comdex booth in November '96.

Walter Chung

Disc Editor Sean Downey replies: *The Yamaha CDR102, HP SureStore, and Philips CDD2000 have been on the market since early '96, and the CD-R feature focused on the latest drives available. Philips' and HP's new 2x6 CD-Rs didn't arrive in time for the feature. Yamaha has been showing a 6x6 prototype but it looks to be a while before they have a finished product.*

Yamaha's new 4x6 is the fastest CD-R drive shipping. The fact that they plan on shipping an IDE/ATAPI version of the drive is also newsworthy—we've yet to see a CD-R drive successfully pull that off.

Is Klamath wired with Fire?

There's a debate I want to settle: Is FireWire going to be out with the new Klamath Pentium Pros? I've heard that Apple has been trying to get it to work for years with no success. Other people are saying it will be out by the third quarter of '97.

What's the real deal?

Paul E. Brinich

News Editor Bryan Del Rizzo replies: *Although Universal Serial Bus (USB) is currently making a lot of noise, it's likely you'll see PC systems integrating both Klamath and FireWire later this year.*

FireWire, a.k.a. IEEE 1394, is a more versatile and higher-speed digital connectivity standard than USB, but its proliferation is in no way linked to the Klamath Pro release. In fact, we've already had the chance to play with FireWire-compatible products, namely Miro's video capture card and Sony's digital camcorder (reviewed in boot *05).*

The spread on 3D thoroughbreds

I don't like 3D card reviews based primarily on benchmark scores. What good is a Matrox Millennium without alpha blending, texture mapping, and other features that really make the 3D experience? Who cares how fast a thoroughbred is if it can't carry the jockey?

Many people are being sucked into thinking that one card is better than another based purely on numbers. Benchmark software can't tell me if I'm going to have a religious experience with a 3D card, and I don't expect it to.

John Landino

Technical Editor Chris Dunphy replies: *When it comes to 3D accelerators, a number from some contrived test really doesn't mean much. Visual quality matters a lot, as does the overall coolness of a given architecture, and of course, software support. You can rest assured that the "hard" numbers are just one of the many things* boot *looks at when reviewing 3D cards. You can trust us to guide you toward a 3D epiphany.*

"Benchmark software can't tell me if I'm going to have a religious experience with a 3D card..."

I wanna be 3D

I love your magazine and the 3D card reviews, but you never reviewed the Diamond Stealth-3D 2000.

I'm looking to get a 3D card and I was wondering which is the best: ATI 3D Xpression+ PC2TV, Diamond Stealth3D 2000, or the Matrox Mystique.

Jason Dziegiel (a.k.a. Sid Vicious)

Technical Editor Chris Dunphy replies: *Both the Stealth3D 2000 and the Mystique were fine cards when they first came out, but they aren't well suited for gamers today. The ViRGE in the Stealth3D lacks 3D speed, and the Mystique lacks key 3D features such as bilinear filtering and fogging.*

From your list above, only the ATI 3D Xpression+ PC2TV was found bootWorthy in boot *07's 3D card roundup. If you're looking for hardcore 3D power and don't want to pay $300 for a 3Dfx-powered card, check out either the Sierra Screamin' 3D or the VideoLogic Apocalypse 3D. Both run at $199 and deliver 3D performance to make the cards on your list cry.*

Let it be

I agree with the "Ain't nothin' like the real thing, baby" editorial (Editor's Words, *boot* 06). People are trying to move further and further into virtual worlds simply because they can.

However, this phenomenon reminds me of a similar time in our recent past. That of the late '40s to the '60s. This was a time when technology, industrialism, and production allowed us to replace everything from mother's milk to grass with wonderful substitutes, which we created to be better than the real thing.

Now our culture is swinging hard back the other way. Nobody in their right mind would feed their kid from a bottle when breast feeding is available. Hell, I know one mother who was still feeding her baby breast milk after two years. Ouch! We have since found breast milk to be medically beneficial, and more natural.

This new trend of turning away from technology to the more natural, ecological, and earth friendly is very interesting. I think we'll see the cyber stuff and virtual worlds go through the same long cycle. Sure, it's cool to use cutting-edge software and hardware to create artificial worlds, and I enjoy *Duke*, *Descent II*, and *Quake* as much as anyone else. But eventually, we'll end up in the real world because we are genetically designed to be here. That's not to say we should go down the street killing with abandon. Save that for postal workers.

Ben Smith

DVD vs. laserdisc

I question your statement "The new format [DVD] will display a much sharper image than current laserdisc players..." ("Pure Power Preview" feature, *boot* 05).

As an engineer who works at one of the major DVD companies, an owner of two laserdisc players and a Sony Digital Satellite System (DSS)—which uses MPEG-2—I beg to differ! I've yet to see the digital artifacts which MPEG-2 can produce appear on a laserdisc, yet this will be a problem with DVD as I understand it.

I've experienced digital artifacts on my DSS system on many occasions and I can assure you that MPEG-2-based systems are not as good in picture quality as laserdisc. I would love it if DVD actually could beat the picture quality of laserdisc, but from what I've seen on DSS thus far, MPEG-2 has nothing on laserdisc!

Andy Bosik

Technical Editor Chris Dunphy replies: *Since MPEG-2 is such a highly compressed format, the more time and care put into encoding, the better your result. Most DSS video streams are encoded in real time at the satellite uplink center, and they are also being bandwidth throttled to fit more channels into the allotted space. When a movie is mastered for DVD however, a slower and more accurate MPEG-2 encoding process can be used and the video stream won't need to be throttled to share the bandwidth. The whole DVD encoding process will be overseen by human producers who will keep an eye out for any artifacts and go in and tweak them away.*

So, to answer your question—a poorly encoded rush-job DVD movie will look no better than DSS, but a professionally-produced DVD movie should blow your laserdisc out of the water. Of course, for the real answer, we'll just have to wait and let our eyes decide once the first DVD movies are released.

Looking for 3D in all the wrong places

I just dumped my P60 system for a Pentium Pro 200. I went from the standard 1MB Windows accelerator to the Diamond Stealth3D 2000XL with 4MB,

▶ 11

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and I don't see any difference except less flicker. Now I've never actually seen a 3D card work, but from what I've heard, I should see some difference, shouldn't I? Do I have it installed right?

Jeremy Johnson

Disc Editor Sean Downey replies: *You should notice the difference immediately upon firing up your machine. Win95 will drop you in the middle of its desktop and arrange all the 3D-rendered icons around you. To your left you'll see an especially crisp Gouraud-shaded trash can in the corner. Instead of dragging your trash as you've done in the past, you will now be able to throw it with motion-captured precision...*

We're kidding, of course. 3D acceleration needs to be called specifically from the software. So you'll need to run a game that supports your particular 3D hardware in order to see the 3D.

> "I, myself am guilty of spending a lot of time online. However, I know the difference between the Internet, "and real life."

Vacation from cyberspace

I thoroughly enjoyed the On the Line column ("The Myth of Cyberspirit") in *boot* 06. I, myself am guilty of spending a lot of time online. However, I know the difference between a computer, the Internet, and real life.

It makes me very sad to see all these poor souls on IRC that literally live their lives sitting in a chat room where they are void of human contact. Hiding behind a name or an avatar, these people lie to themselves and others every day. Far too many people are addicted to the anonymity that the Internet provides. I think this is truly unhealthy. Those who preach the spirituality of the Internet are seriously disturbed.

Jared Rogers

Speed is life

Thanks to your little blurb about running *FastVid* on Pentium Pros for *Quake* (review of Gateway G6-180, *boot* 03), I noticed that *FIFA 97* and *NHL 97* were dropping a lot of frames and running a little sluggish, so I called Electronic Arts and they couldn't figure it out. I remembered using *FastVid* for *Quake* so I though I would give it a try for the others and blammo! It was beautiful.

It's little things like this that make your magazine rock.

Ryan

Hackers get a bad rap

I'm 14 and an active hacker. I don't know what you guys think about that, but I'd like to know what you think about hackers who create devastating viruses that just totally kill someone's computer. I don't exactly like people who do that. My friend and I have gotten many different hacking utilities and we don't go around infecting people with NATAS or Michelangelo. You get the point.

Michael (a.k.a. Jade Falcon)

WebMaster Daevid Vincent replies: *We don't dig people who write destructive viruses or hack for malicious reasons, either.*

All tech, all day

Do you have a special section for technical issues, such as PC tweaking, trouble-shooting, and answering questions about DLL and INI file modifications? Will *boot* be doing more trouble-shooting and will there be a *bootDisc* full of software that's specifically designed to deal with these situations?

John Devereaux

News Editor Bryan Del Rizzo replies: *Since the purpose of the* bootDisc *is to complement the reviews and feature stories in the magazine, it's doubtful that an entire disc will be devoted to trouble-shooting technical issues. However, we'll always include utilities we think will be useful to the* boot *reader, and it's highly possible a feature story devoted to trouble-shooting will appear in a subsequent issue.*

In the meantime, check out the bootClinic *for helpful information about a variety of topics.*

Is there a motherboard rest home?

I've been contemplating the purchase of an Overdrive chip for my aging hand-built P90. The upgrade will boost the speed to a hefty 150MHz. Should I rush to the nearest computer store and buy one, or should I stick with my current hardware and save up for an MMX-equipped monster?

Marlon Martinez

Reviews Editor Andrew Sanchez replies: *How old is the motherboard? If it can handle MMX, then I'd say bypass an Overdrive for pure fuel injection. Buy a new P200 with MMX technology, slap that puppy in a ZIF socket, and buckle up. Check with the manufacturer to see if your motherboard can take it. If not, you'll need to bite the bullet and buy a new motherboard and MMX CPU. You'll thank us in the long run.*

BTW: *Intel has announced Overdrive chips with MMX , but we'll have to wait until later this year to see how they're implemented.*

For the untouchables

You've probably already received loads of e-mail like this, but that's OK—you should because you're the best! I just *have* to tell you guys how wonderful you are in making such an awesome product: *boot*! I loved the first issue, and every issue since, even better. Keep it up 'cause nothing else comes remotely near this mag!

Ard Haskell

boot has had a profound impact on my life. I used to dig through other magazines, trying to glean a little info about the best games, hardware, and future for the PC. Then I stumbled on *boot* 01. I instantly knew I had found *the* magazine for me. Never before had I found such a hip, up-to-date, power-user oriented magazine. I subscribed right away. Keep up the great work!

Eric Griffin

Your mag is the best. It has stuff that I actually want to read about—and that CD-ROM! Wow, it's all good stuff, no crap! I really enjoyed the section explaining RAM in *boot* 06, answered all my questions about all that DRAM, SRAM, SDRAM, etc., etc. One more thing, is it possible to get back issues of *boot*? I missed *boot* 01 and *boot* 05 and I want them badly!

Eric C.

I saw an article in a back issue of *boot* regarding installing a simple network arrangement for interactive gaming. I lost my issue, and now I need that article! I'd appreciate it if you could point me in the right direction.

Steve Overby

You can order back issues through our Customer Service department, see page 97 of this issue for information. You can also call 415.468.2500.

Was it something we said?

Please, please stop printing obsequious groveling mail about how wonderful your magazine is. Yes, yes, your magazine *is* great, but I don't need to hear it so many times. I know you print a couple of negative letters, but that's no excuse for the plethora of positive ones. At least the negative ones make more interesting reading!

Iain Huxley

Cut, Copy, Paste

The "Biology Song" (*Virgil Reality*, reviewed in *boot* 06) attributed to Charles Fleischer and Scott Paige, was not co-written, but was the work of Charles Fleischer.

The product info for *SimGolf* (reviews, *boot* 07) is Maxis, 510.933.5630, www.maxis.com; and for *Links LS* is Access, 800.800.4880, www.accesssoftware.com.

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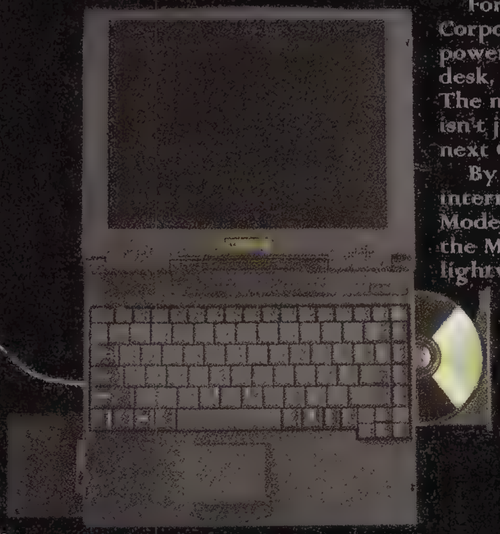

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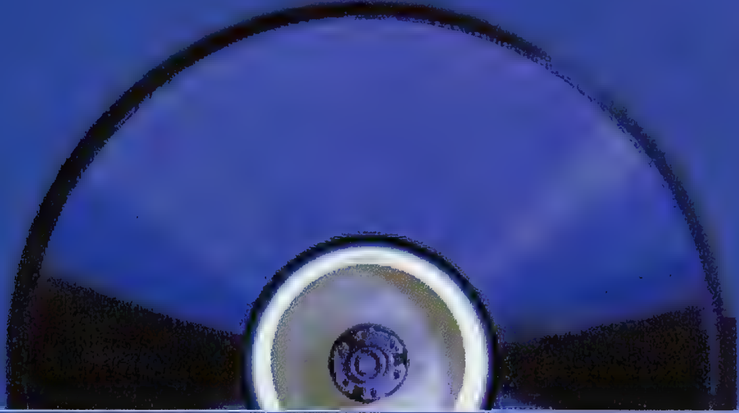
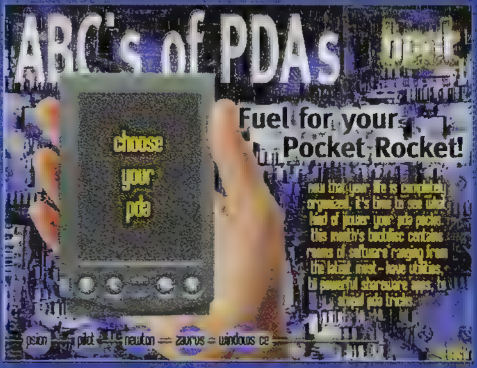
boot DISC

EIGHT

Every month, ***boot*** magazine delivers 600+MB of the hottest software and exclusive demos. If it piques your interest in the magazine, look for the ***bootDisc*** logo and you'll find the fattest demos and coolest apps to complement our cutting-edge previews, reviews, and features.

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Feature: Fuel for your Pocket Rocket

We pillaged every shareware site imaginable to bring you the most comprehensive collection of PDA software ever offered on a covermount disc. Selecting Psion, Zaurus, Pilot, Windows CE or Newton brings up a listing and description of every item in the software collection. Here are a few that you will find.

Demos:

Win95 and NT 3.51. Demo is a save-disabled version of the full application. By 4DVision. **See the review on page 100.**

Fractal Design
DETAILER

Win95 and NT. Demo is a save-disabled version of the full application. By Fractal Design. **See the review on page 100.**

Win95. Demo is limited to one standard campaign. By New World Computing. **See the review on page 89.**

Win95. Demo is limited to two levels of gameplay. By Grolier Interactive. **See the review on page 102.**

Win95. The shareware version limits gameplay to two levels as the warrior. By Blizzard. **See the review on page 79.**

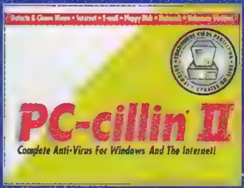
Win95. Demo is a stripped down version of the full game with limited campaigns. By Sierra On-Line. **See the review on page 89.**

COREL
DRAW 7

Win95 and NT. Evaluation version of full application expires in 30 days. By Corel. **See the review on page 98.**

FLYING CORPS

DOS. Demo is a stripped down version with reduced landscape and limited missions. By Empire Interactive. **See the review on page 99.**


PC-cillin II
Complete Anti-Virus For Windows And The Internet!

Win95. Evaluation version of full application expires in 30 days. By Touch-Stone. **See the review on page 105.**

Psion Software

Panic An application that displays the large, friendly words "Don't Panic" on the screen when you switch on your PDA.

Periodic Displays the periodic table and information about the elements.

Virland (Virtual Landscape) Allows you to explore the country without ever leaving your armchair.

Zaurus Software

Zffexp Allows you to access the data contained in a Zaurus folder file on your PC.

Zetris Zaurus' version of *Tetris*.

Zinstall The new version of the Sharp Zaurus Add-on Software Installer.

Pilot Software

Qmate Allows you to enter *Quicken*-specific financial information on your Pilot and through the use of its accompanying conduit generate .QIF files, which can be imported into *Quicken*.

GolfScre Designed to function as a score card used during a round of golf.

DinkyPad A doodler that lets you draw directly on the screen with your stylus or use some basic graphics tools for simple image creation.

Hell, we've even included

Wwrest A simple Pilot utility with the sole purpose of reminding you to take breaks when you're working.

Windows CE Software

Mobile.nws A mobile news reader.

Qtbce A Quote ticker bar.

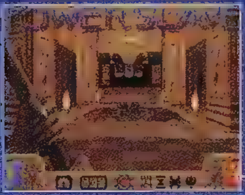
Powtoy The popular Power Toys from Microsoft.

Newton Software

JXBackup Turns double-taps on silkscreen buttons into customizable actions!

JXPurge Answers the question—Why don't check lists delete "checked" items in checklists? Well, now they do!

You'll need to install the software separately from the interface, and to aid Win95 users we've created a link that drops you directly into the PDA's directory.



DOS. Demo limited to four standard levels, a training level, and a special network level. By Mindscape. See the review on page 106.

Luckman's
WebEdit
PRO

Win95 and NT. Evaluation software expires in 30 days. By Luckman Interactive. See the review on page 98.

DOS. Demo limited to a couple of levels of the full game. By Grolier Interactive. See the review on page 106.

The *bootDisc* is compatible with both Windows 95 and 3.x. Run start95.exe to launch under Win95, and start31.exe under Win3.1. *boot* recommends a Pentium 90 or better with 16MB for access to all the software that's included. Slam the *bootDisc* into your CD-ROM drive to give yourself an injection of Pure PC Power.

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bootNet sports many of the exciting features that make *boot* magazine such a valuable resource for the hardcore PC enthusiast. There are reviews and previews, bootWorthy products, and an expanding archive of articles from past issues of *boot* online for easy reference, complete with a search engine.

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Have you ever wanted to respond to a letter you read in *boot*? Our letters to the editor section is just the ticket. Not only can you respond to articles and other readers' views, but you can also state your own opinion for debate.

P/Reviews

An archive of all the bootWorthy reviews we've run in the past. Maybe you missed that great round-up of the high-end 3D graphics accelerators back in November or you've read the hype about Personal Digital Assistants and now you need one too! We'll dispel the myths and point you in the right direction.

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-PC World 02.97

> "Its most stunning result was on our Graphic Winmark 97 test suite: Powered by an STB Velocity 3D, the system [Gateway P55C-200FPC] posted an astronomical score that put it 51 percent ahead of the nearest home PC competitor."

-PC Magazine 02.04.97

> "Overall, the Velocity 3D was faster than the Stealth 3D 3000 XL by as many as 6 million pixels per second (at 1280x1024, 8-bit color depth)..."

-boot Magazine 02.97

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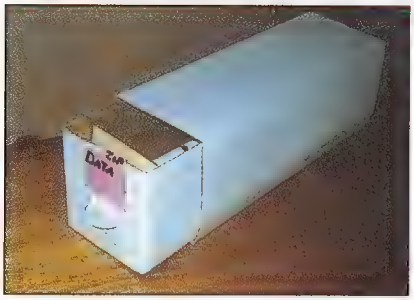


1997 is only a few months old, and we've already witnessed the coolest product of the year: the Archive Disk File System from Weber & Sons Inc.

You've dreamed of a handy storage solution for your ZIP drive's cartridges and it's finally arrived... in the form of a cardboard box. But before you dive in and use your new storage facility, Weber & Sons feel it's necessary to explain proper use and operation of the box. The following is an excerpt from their press release:

"In use, the system works this way:

1. Number each of your cartridges.
2. Now place them in the file's drawer in numerical order.
3. When a cartridge is needed it will be easy to find because the pull-drawer file slides out either the front or the back of the tube-like sleeve.
4. When the file is full, write on the label on the front of the drawer to identify its contents.
5. Now store the entire file on a shelf."

Now, if they could only explain how to get the damn drawer open...

All Quacked Up

A hand-held chicken video game, called *Tamagotch*, or "cute little egg" is the latest craze to hit Japan, and will soon be legging it to U.S. shores.

This key-chain sized game contains a small display screen on which an egg hatches and a baby chicken is born. To play the game, you have to take care of the chicken by properly feeding it, playing with it, and cleaning up after it. You can also monitor the chicken's health by taking its temperature and feeding it medicine. If you take good care, the chicken will grow in size and the game will continue for several days.

However, if you fail to properly take care of the chicken, the game will emit a "peep, peep, peep" sound, the chicken will get angry, grow sick, and eventually die.

Credit Check

This month, ConsumerInfo.Com will launch one of the first Internet sites that will allow you to order, monitor, and receive Experian (formerly TRW Information Services) credit information and reports online.

The service provides paid subscribers with copies of their credit reports and alerts them to any negative information affecting their credit history, such as late payments, erroneous statements, and bankruptcies. Requested reports can be delivered electronically (taking up to two hours) or by snail mail (three to five working days). In addition to the reports, the site also provides information about credit awareness, reading and understanding credit reports, and how to handle report discrepancies.

An annual subscription costs $49.95, but a free three-month trial subscription is available now at **www.consumerinfo.com**.

Mystery of Missing Mac OS Solved!

After canceling Copland this past fall, many industry observers were left wondering just what Apple engineers had been doing for the past three years when they were supposedly finishing up the new Mac OS. That mystery has been solved—Apple has spent the past three and a half years designing the "20th Anniversary Macintosh," a $9,000, four-inch thick "collectible" Mac that looks like it belongs in the museum of modern art rather than on a desk. You can check out the whole story at **20thanniversary.apple.com**.

ROBO-ROACH

Those big, furry Saint Bernards best known for finding avalanche victims in the Swiss Alps may soon be out of a job. A team of micro-robotics and biology specialists at Japan's Tsukuba University, who breed American cockroaches and then equip them with high-tech backpacks consisting of tiny microprocessors and electrode sets, has been awarded $5 million in research funds by the Japanese government.

The team of researchers breeds its own supply of Perplaneta Americana because it's the biggest and apparently the hardest to kill of all roach species. Fully grown roaches are gassed with carbon dioxide, their wings and antennae removed and replaced with a 0.1-ounce pulse-emitting electrode which forces the roaches to turn left, right, forward, or backward. According to a university spokesperson, electronically enhanced insects (with cameras and other sensory devices) could be used effectively for search and rescue missions, or even espionage surveillance.

"Cockroaches are very strong," says Swiss researcher Raphael Holzer, part of the Tsukuba University team. "They can lift 20 times their own weight."

Missing MMX Instruction Sets

MMX may contain 57 new instruction sets, but it originally contained 100. Here's a smattering of the ones Intel decided to cut at the last minute.

TMEC Tickle me instruction set.
SVGA2TXT Converts 1024x768/16-bit color displays into CGA text.
DX2OGL Senses any Direct3D application and converts it to OpenGL.
DAISY Hidden music subroutine that sings a song.
SKYNET Disable artificial AI that becomes self-aware on August 19th, 1997.
FFE Force a Fatal Error.
GPF Force a General Protection Fault.
STAL To slow down those really fast machines.
NOCOMP Doesn't work if code is running on a non-Intel chipset.
PROULET Randomly deletes files from your hard drive.
PSPIKE Channels all electrical currents into the CPU causing a meltdown.
FPBE Re-enable the notorious Pentium floating point bug.
MAC Enable Macintosh compatibility mode.
SLWDN Causes non-Microsoft programs to slow down by 30 percent.
DOWOP 50's music generated in real time with only a 10 percent CPU load.
DOWUP Triggers another rise in Intel stock.
BILLG CPU enters remote control mode from Redmond, WA.
YAKO Triggers the *Animaniacs* screensaver.
THUNK Sets a new protocol for streaming info from the CPU directly into your brain.
XXX Stores all smut in the CPU cache for faster access.

Gouging for God

The explosive growth of the Internet this past year has seen opportunists rush to snatch up domain names they hoped to sell later. Some of these addresses have been snatched back by corporations based on claims of trademark infringements, but no one has a trademark on Jesus... Yet. In fact, one lucky soul just leased www.jesus.com to The Ministries of the Lord and Teacher Jesus Christ for $100,000 for 10 months. Amen, brother, you hit the jackpot.

America Online Faces Problems

Can more than 8 million subscribers find happiness on 200,000 modems?

Facing increasing complaints of bad service, long interruptions, faulty connections, and overloaded phone lines, America Online has finally conceded that it may have bitten off more than it can chew.

Despite being the nation's largest ISP with more than 8 million customers, AOL's recent marketing blitz, including television commercials, a new monthly flat rate of only $19.95, and 50 free hours online has resulted in over one million new subscribers in the first six weeks alone. Since September 1996, e-mail messages have doubled to 18 million pieces a day and total online time has tripled to more than 125 million hours per month.

Since the current AOL computer system can only handle 260,000 users simultaneously, the increased usage has created massive service shutdowns (including a 19-hour disruption), overloaded phone lines, and unreliable service. Six class action lawsuits seeking either punitive or exemplary damages have been filed on behalf of the thousands of AOL members who have experienced problems accessing the service.

"This is a service industry," says Larry Cohen, Group Product Manager for the Microsoft Network, "and if people can't get the product they bought and paid for, then that's a huge problem the entire industry should be concerned about."

According to AOL spokesman Matt Nerzig, AOL is spending more than $350 million to upgrade their technical infrastructure, and plans to increase the number of modems in use from the current 200,000 to more than 400,000 by spring 1997. They're also adding more than 600 customer service representatives, for a total support network of 4,500 personnel, representing approximately 75 percent of AOL's total work force.

"We think 400,000 modems is the number that will bring current member levels, under the current pricing plan, back in conformity with no waits and delays," Nerzig says. "Three years ago, we had one modem for every 100 subscribers. Our new plan is to have one modem for every 20 subscribers."

"This is a service industry, and if people can't get the product they bought and paid for, then that's a huge problem the entire industry should be concerned about." —*Larry Cohen, Group Product Manager, Microsoft Network*

In contrast, most local ISPs allocate one modem for every 12 subscribers.

Additionally, since AOL's flat-rate plan didn't go into effect until last December, chances are most AOL customers haven't yet started taking advantage of the benefits of unlimited access. Once they realize the billing clock is no longer ticking, they'll begin spending more hours logged onto the network, or start downloading huge files they previously would've written off as too expensive. It's much more convenient to stay online continuously than log off every time you need to grab a snack or go to the bathroom.

Although AOL believes membership numbers will remain steady in the coming months, they deny there have been mass customer defections since they broke the 8 million subscriber mark. In fact, Nerzig believes that in the next few months, "the number of people joining will probably equal the number of people defecting."

But where are the almost 275,000 customers defecting to each month?

When asked if they had noticed an increase due to AOL's service problems, Slip.Net, a local ISP provider in San Francisco told *boot* "Yes, and God bless them for it."

"We've seen a significant increase in the number of new EarthLink members signing up who say they've left AOL," says Sky Dayton, founder and chairman of EarthLink. "We call these new members 'AOL Graduates', because they're graduating from an old online service to an open, direct Internet connection."

Although Microsoft has allocated $100 million to entice online newcomers to MSN, they claim they're not actively campaigning to convert AOL members. But CompuServe, which launched a costly new television campaign during this year's Super Bowl, estimates that of the thousands of customers they recently signed more than half were originally from AOL.

So why is AOL so popular? Are AOL customers radically different from customers utilizing the services of an ISP? According to Nerzig, the answer is yes.

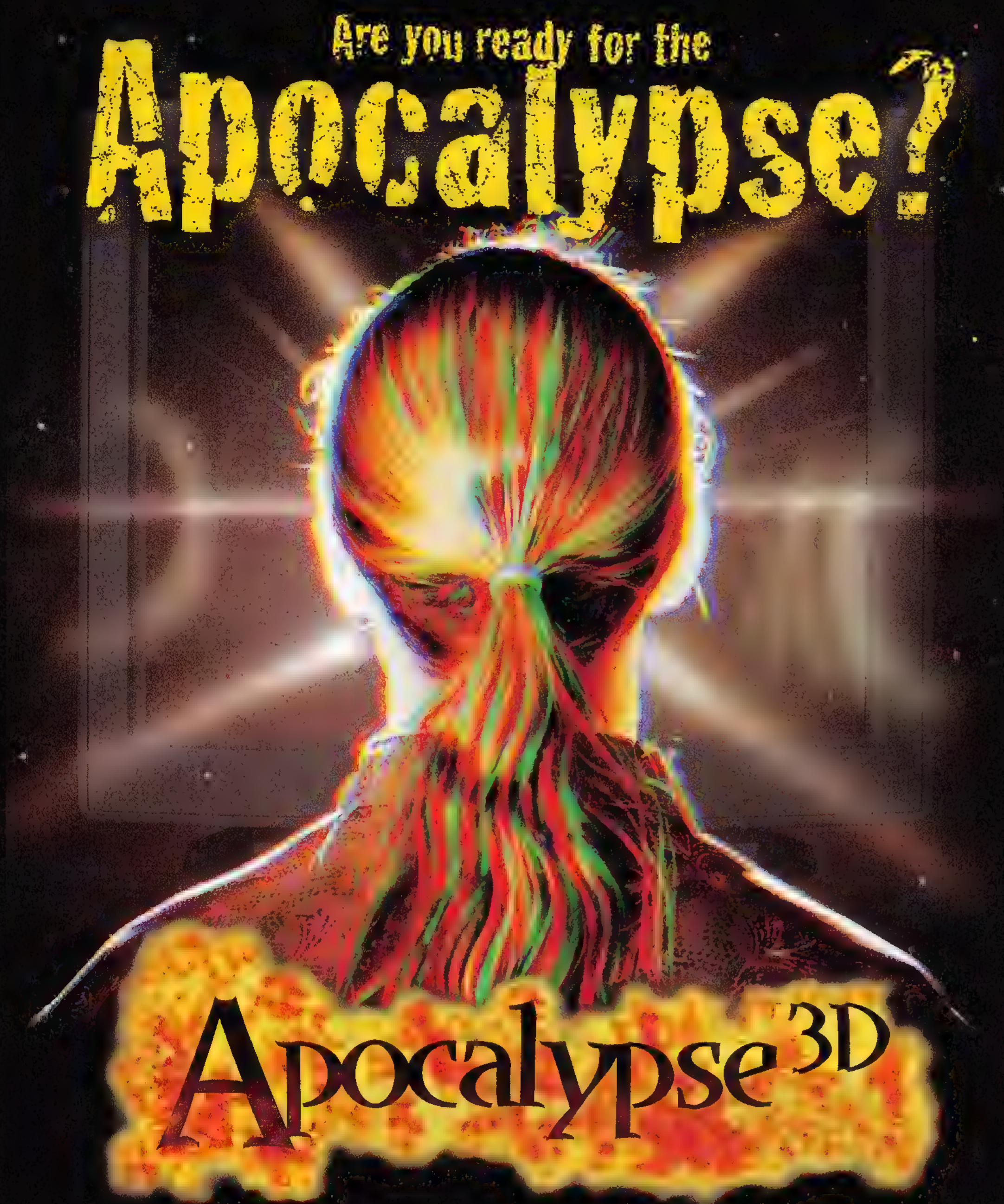
"The main reason why AOL is so popular isn't because of the Internet connection, it's because of the AOL content," Nerzig says. "If you're a hardcore Internet user, then you're probably getting those ISP services to get online. Lots of people who go on AOL don't go on the Internet. AOL content is different and superior to what can be found on the Internet itself or other online services."

But while an ISP offers a direct, unrestricted pipeline to the Internet, AOL certainly doesn't. In fact, their proprietary WWW browser (version 3.0) is nightmarish to use, thanks in part to the lack of support for Java, Java Scripts, and transparent 89a gifs. AOL is also well-known for censoring newsgroups, message threads, and chat rooms in order to reduce the purported offensiveness of the Internet.

Even though AOL plans to dramatically scale back marketing efforts, they're (ironically) asking consumers to cut back on their online time. "There's something you can do to help," says Steve Case, chairman and CEO of AOL, "and that is to moderate your own use of AOL a bit during our peak evening periods. Use AOL as much as you want during the day, but try to show some restraint at night during the next few months when we're in this transition mode."

Or, as many customers are currently choosing to do, not at all.

— *Bryan Del Rizzo*



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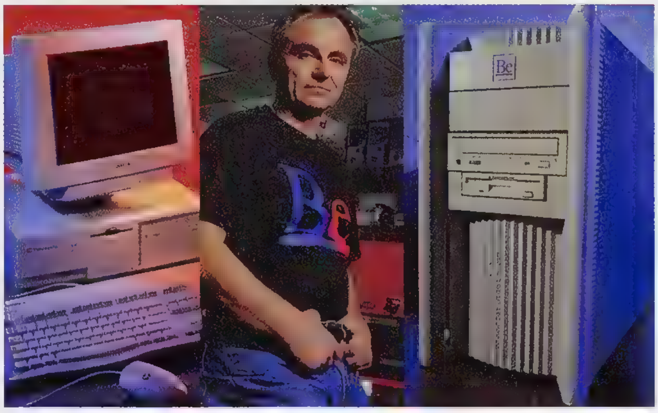
Be Abandons Their Box

BeOS to stand alone following successful port to Power Mac hardware



Jean-Louis Gassée (middle) is hoping the BeOS will get a new life on the Power Mac (left) platform. On the right, BeBox hardware, now defunct.

Be Inc. recently announced it is abandoning the BeBox hardware—first introduced in 1995—and will instead concentrate on developing and marketing the Be operating system (BeOS) for use on the PowerPC platform.

“With the port of the BeOS to Power Computing hardware there's no longer a need to create special hardware to run the BeOS,” says Michael Rosenfelt, Director of Marketing for Power Computing.

Be's announcement—which read more like a corporate mission statement—was posted on Be's web site and e-mailed to Be software and hardware developers. In it, the company explained that although the port of the BeOS to the Power Mac architecture had proven to be a success, it would be physically and financially impossible for the small 50 person company to “keep up with the hardware engineering resources of the entire Power Mac market.”

Be's decision, effective immediately, has angered many Be customers who feel the company should have at least phased out production over a period of six to nine months. According to Be, ceasing production of the BeBox hardware is the only solution for eliminating all possible conflicts of interest with hardware vendors intent on bundling the BeOS. Rumors linking this decision to an impending deal with a Power Mac clone manufacturer are, according to Be, completely untrue.

“The decision to cease BeBox production was certainly very strongly influenced by the level of interest in the BeOS for Power Mac, but was not related to any specific deal,” says Jean-Louis Gassée, chairman and CEO of Be Inc.

Although Be claims their main focus has always been software development, it's not surprising that many pundits, fanatics, and BeBox owners feel betrayed by this abrupt decision. It was Gassée's idealistic and passionate vision—of a future with an exciting new operating system, seven parallel processors, and a Geek Port—that indoctrinated them to join the Be revolution in the first place. Many are viewing Be's decision to abandon hardware development as a corporate sell-out, and worse, a personal failure for Gassée, their proclaimed champion and leader, and former Apple employee.

“Being a developer with Be—and being called one of the geeks made me feel quite good,” says Dirk Herrendoerfer, a BeBox developer. “But it doesn't make any sense to me to continue developing hardware for a dead platform.”

Although Be only initially planned to support current BeBox owners for a period of 12 months, early criticisms have prompted Be to extend hardware support at least through the end of 1999.

“In announcing 12 months support with ‘best efforts’ thereafter, we certainly intended to do our best to support the BeBox for a few years, but this is not the same as announcing a formal three-year commitment,” says Gassée. “The feedback from developers could certainly be characterized as an outcry, and we responded to that.”

The BeOS and BeBox could have been legitimized if the rumors of it replacing Copland, as Apple's newest operating system, were true. Unfortunately, that deal fell apart when Apple decided to use the NeXT operating system developed by former Apple visionary and founder, Steve Jobs.

“With NeXTStep, Apple hopes to finally gain a foothold in Corporate America,” says Gassée. “So, we respect Apple's decision and we stay focused, as we always were, on the creative digital media applications.”

> “With NeXTStep, Apple hopes to finally gain a foothold in Corporate America. So, we respect Apple's decision and we stay focused, as we always were, on the creative digital media applications.” — *Jean-Louis Gassée, chairman and CEO of Be Inc.*

Regardless, many still believe the BeOS has a solid chance of survival.

“Although the BeOS has some growing to go through, it's on the right track,” says Dave Haynie, vice president of engineering for Pios Computer, a non-Power Mac clone manufacturer. “Be needs to be effective in spreading the word, spreading the OS, and supporting the development of programs. The first bits I've seen are very promising.”

Even Joseph Palmer, Be's former director of hardware engineering (who left to start his own video and editing company), believes the BeOS to be the better operating system. “The BeOS is fresh, clean, and fast,” says Palmer. “When you use the BeOS you can begin to feel what a computer should (and will) be like.”

Still, not everyone is convinced.

Joanne Dow, who works for Wizardess Designs, a software firm developing a MIDI Show Control application for the BeOS, stated “I don't know. My ‘reality checker’ based on 53 years experience says it is probably dead. But we have so much invested, we just hope it [the BeOS] will survive long enough to launch our product.”

But many BeOS developers are enthusiastic about the leap in the hardware install base, an increase from less than 2,000 units to well over a million units. To them, the move affirms the BeOS's viability.

And what about the row of flashing lights, the promise of seven parallel CPUs, and the much-heralded Geek Port—features that made the BeBox so unique?

Michael Rosenfelt of Power Computing says, “they're very cool, and we're looking at them for possible integration into our next round of product development design.”

— Bryan Del Rizzo

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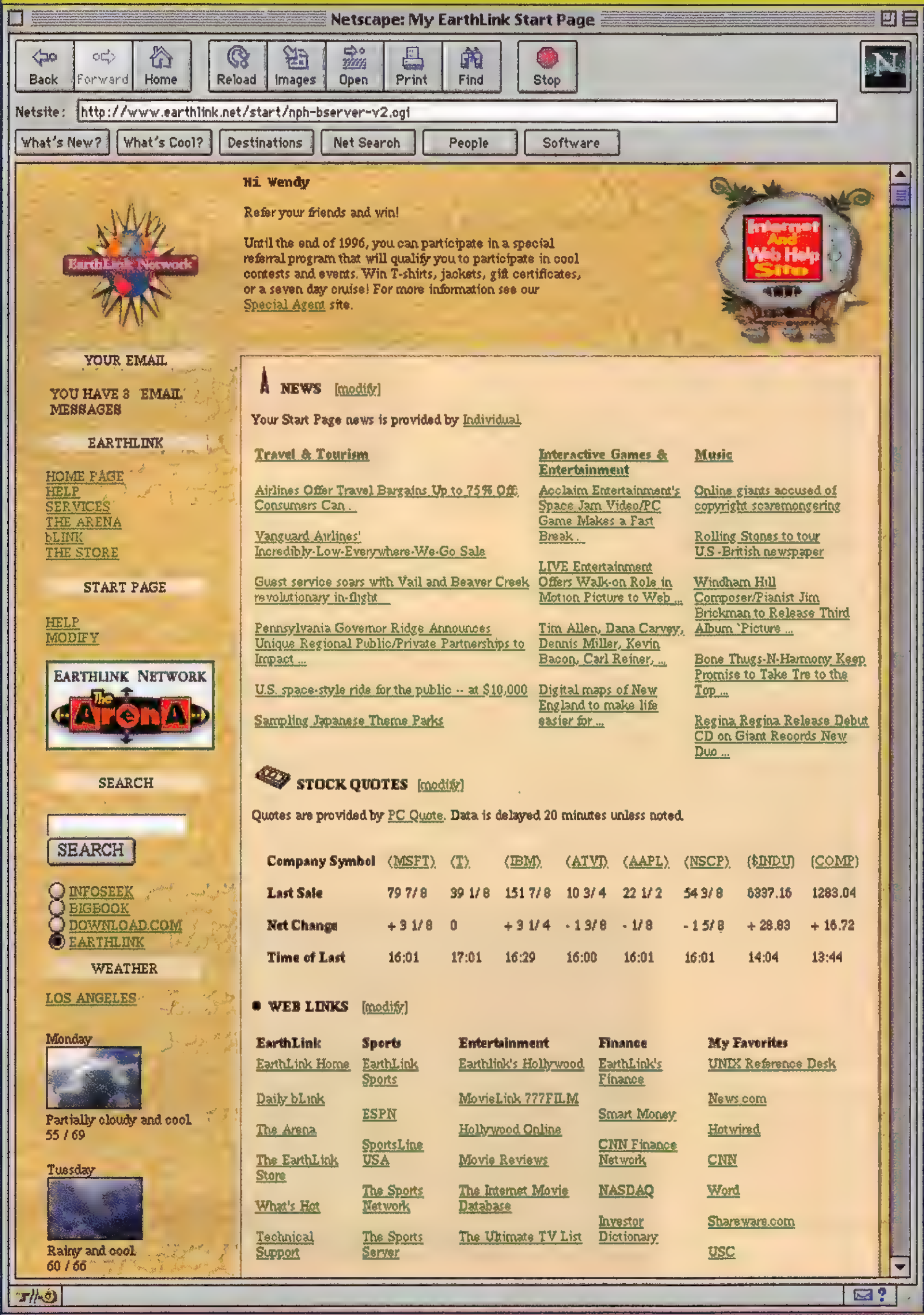

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WEATHER

LOS ANGELES

Monday
Partially cloudy and cool
55 / 69

Tuesday
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60 / 66

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Until the end of 1996, you can participate in a special referral program that will qualify you to participate in cool contests and events. Win T-shirts, jackets, gift certificates, or a seven day cruise! For more information see our Special Agent site.

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- Guest service soars with Vail and Beaver Creek revolutionary in-flight ...
- Pennsylvania Governor Ridge Announces Unique Regional Public/Private Partnerships to Impact ...
- U.S. space-style ride for the public -- at $10,000
- Sampling Japanese Theme Parks

Interactive Games & Entertainment

- Acclaim Entertainment's Space Jam Video/PC Game Makes a Fast Break ..
- LIVE Entertainment Offers Walk-on Role in Motion Picture to Web ...
- Tim Allen, Dana Carvey, Dennis Miller, Kevin Bacon, Carl Reiner, ...
- Digital maps of New England to make life easier for ...

Music

- Online giants accused of copyright scaremongering
- Rolling Stones to tour U.S.-British newspaper
- Windham Hill Composer/Pianist Jim Brickman to Release Third Album 'Picture ...
- Bone Thugs-N-Harmony Keep Promise to Take Tre to the Top ...
- Regina Regina Release Debut CD on Giant Records New Duo ...

STOCK QUOTES [modify]

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Last Sale	79 7/8	39 1/8	151 7/8	10 3/4	22 1/2	54 3/8	6337.16	1283.04
Net Change	+ 3 1/8	0	+ 3 1/4	- 1 3/8	- 1/8	- 1 5/8	+ 28.83	+ 16.72
Time of Last	16:01	17:01	16:29	16:00	16:01	16:01	14:04	13:44

WEB LINKS [modify]

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- What's Hot
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- EarthLink Sports
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- SportsLine USA
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Entertainment

- Earthlink's Hollywood
- MovieLink 777FILM
- Hollywood Online
- Movie Reviews
- The Internet Movie Database
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- EarthLink's Finance
- Smart Money
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Kiwi Brands: 800.392.7733

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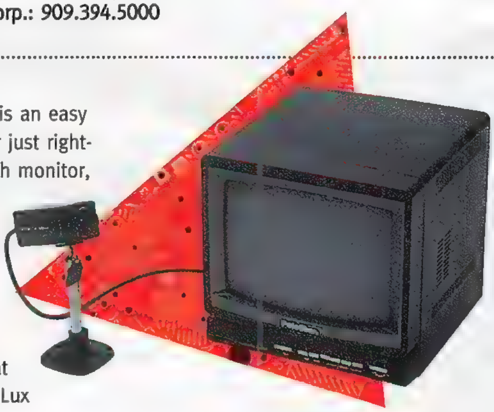
Who goes there?

PoleStar's 12-inch B/W **Quad Surveillance System** is an easy to use peace-of-mind machine for the paranoid or just rightfully suspicious. Featuring a high-resolution 12-inch monitor, four cameras with 4mm lenses, 18 meters of cable, and all the brackets and fixings you need, the system is ready to use straight out of the box. The Quad, which retails for around $900, can even be interfaced with an alarm system and features a trigger connector for VCR recording. The monitor's resolution is 700 lines (at center) and the camera lens is 78° fixed with 0.2 Lux illumination. Sit back and survey!

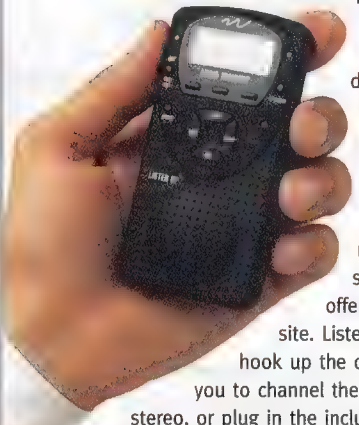
PoleStar: 310.404.1314



Internet audio to go

Audio Highway's **Listen Up Player** is designed for those who enjoy the listen-on-demand factor of online audio content, but want to take their Internet audio to go. The $199 Listen Up Player connects to your PC via a docking station, where one hour of audio content is downloaded directly into the 3.4-ounce player. Unfortunately, downloadable content is limited to the Audio Highway library, but you won't run out of free stuff to listen to. Plenty of audio books, news, movie reviews, children's stories, and business reports are offered on the Audio Highway web site. Listen through the built-in speaker, hook up the optional attachment that enables you to channel the sound through your car's FM stereo, or plug in the included stereo earphones.

Audio Highway: 800.775.4783; www.audiohwy.com



Drive time

Blaupunkt shines again with its new line of car stereo tuners with built-in timers. The **Tuner Timer** works like a clock radio or VCR by enabling drivers to program the timing of favorite radio programs. When the time comes, the receiver switches sources and tunes in the desired station automatically. The top of the line Blaupunkt Las Vegas is a CD receiver with CD changer controls for $399.95. The unit features 35 watts by four channel amplifiers, a detachable faceplate, and Codem III FM tuner. Add a 10-disc changer, and the new Thummer steering-wheel mount remote control for $99.95, and hit the road.

Blaupunkt: 800.950.2528; www.blaupunktusa.com

compiled by David Pescovitz

Fingerprints don't lie

SACMan is a real-time computerized personnel identification system that IDs you based on a totally unique body characteristic: your fingerprints. Put your finger on the SACMan reader and within three seconds your print is analyzed, run through a database of users, and access to the protected computer system is either granted... or denied. SACMan uses a form of "Vector Analyses," where each raster pixel of a scanned fingerprint is converted into vector line types used to classify the print. One entire SACMan system, including the print reader, capture card, SAC software, and a year's worth of software updates, sells for approximately $1,700 when you buy three to five units, with prices dropping proportionately the more you purchase.

Secure Access Control Technologies: 702.798.9777

Memo to myself

The end of microcassettes is imminent. The Olympus **D1000** is a pocket-size (4.76x1.81x0.91-inch) digital voice recorder that weighs only six ounces with batteries. The $250 D1000 interfaces with your PC, has built-in editing features, random access of files, and, best of all, records on flash memory cards. Standard mode sampling rate is 12kHz, with 8kHz at long mode, with a 45dB signal to noise ration. The 2MB removable media card ($50 each) records 16 minutes on standard mode, and 34 minutes on long mode. A 4MB card is also available for $100. Sounds good, right?

Olympus: 800.247.9674; www.olympus.com

D1000
OLYMPUS
2Mbyte
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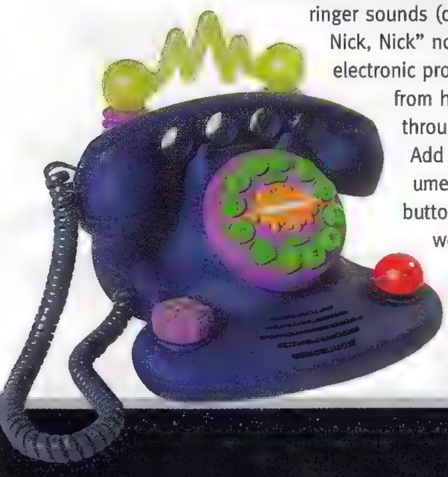
FLASH

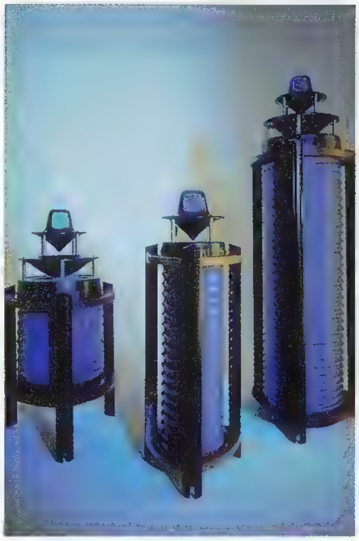
It's for you, Dr. Frankenstein

From Long Hall Technologies and Nickelodeon comes the **TalkBlaster**, a multiringer telephone that would be right at home in a cartoon mad scientist's laboratory. The surreal design features a "Green Slime Power Rod" that flashes when the phone rings and four unusual ringer sounds (cow moo, honk, bell, and "Nick, Nick, Nick" noise). All Nickelodeon "serious electronic products built to last" are made from heavy duty thick plastic and go through "stringent abuse testing." Add a pulse/tone switch, ringer volume control, and flash and redial buttons, and you have a $49.95 workhorse phone that's more fun than a boring old squawk box any day.

Long Hall Technologies: 516.293.6900



Sounds great



Winner of the Innovations '97 Award at January's Consumer Electronics Show, SoundTube's omnidirectional speaker system shoots down the notion that speakers only sound their best in one "sweet spot." The **SoundTubes'** patented, flexible tubular enclosures use audio "lenses" to disperse sound in all directions. No need to hide your speakers in the corner anymore either. The SoundTubes feature interchangeable SoundSleeve (eight in stock and unlimited custom pattern) to fit the decor of any room, and can be hung from the ceiling or wall or sat upright in a stand. Available in two-way and three-way full range systems with eight-inch, 10-inch, or 12-inch speakers, SoundTubes run between $890 and $1,490 a pair.

SoundTube Entertainment: 800.647.8823

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Canon USA: 800.828.4040; www.usa.canon.com

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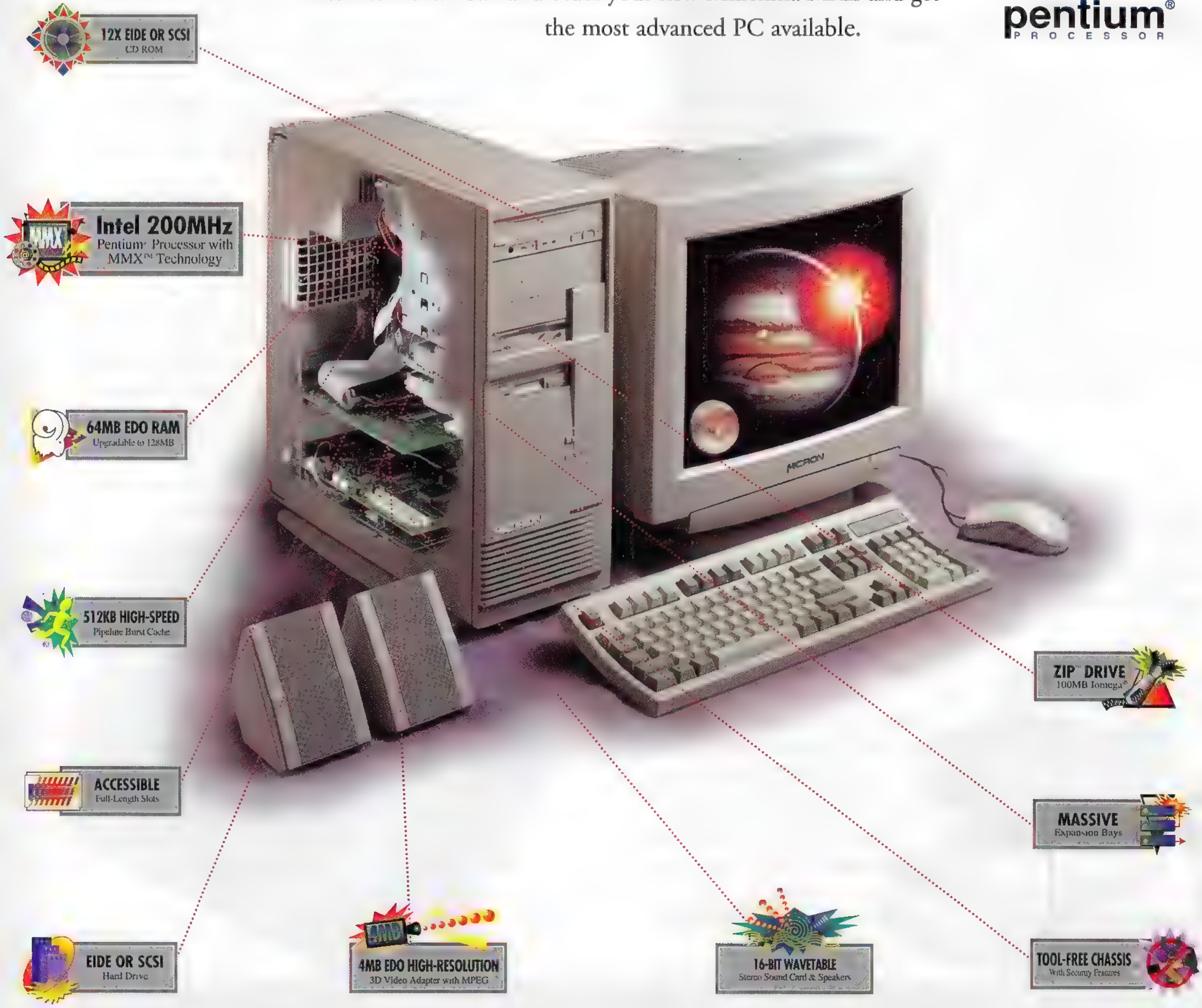
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- 32MB EDO RAM
- 3.1GB EIDE hard drive
- 15" Micron 15FGx, .28dp (13.7" display)
- Microsoft Office CDs

$2,299
Bus. lease $78/mo.

- 64MB EDO RAM
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- Microsoft Mouse, 104-key keyboard
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- Multimedia Xcitement Pak: POD, Adobe PhotoDeluxe, Billboard Music Guide, Blockbuster Entertainment Guide and Eraser Turnabout
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- 16MB EDO RAM
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Product Information Number 232

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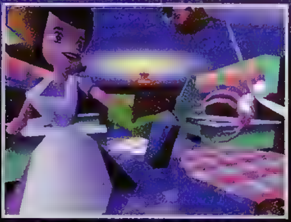

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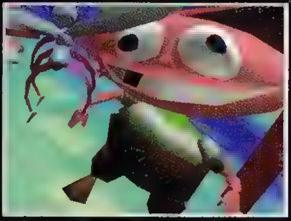
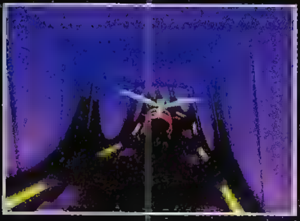


Bug-phobic human adversaries



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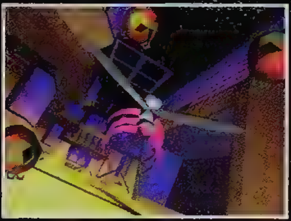

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GRAVITY

FINGER PAINTING IN 3D

THE **URGE** TO **CREATE** CUSTOM WORLDS TO **PLAY** WITHIN

There's an extra thrill in playing a game you had a hand in creating. Maybe this explains the staggering proliferation of custom levels and maps on the Internet. After all, we're born with an innate desire to create, but at some point most people put down their coloring books and stop creating, probably because they're told they don't have the skills to do it "right." But still, the desire is there, and a little nudge (plus the right tools) will rekindle it.

Creating your own game world is nothing new. What's *SimCity* if not a toolkit for making a world? Map builders have long been a part of strategy games, and custom tools, such as SSI's *Dungeon Hack,* even allowed you to create rudimentary RPGs. Strategy gamers have come to expect add-on map and scenario editing modules. And the ability to create custom dogfight encounters became a "required" feature. Until the *Doom* generation, the most powerful world-creating tool was, oddly enough, *Jack Nicklaus Signature Edition,* whose course designer still stands as a landmark of cool simplicity.

It's reached dizzying heights, and shows every sign of just getting bigger.

You can trace the current boom, as you can with many trends in gaming, back to *Doom.* Third-party tools (such as *DoomCAD*) were spawned by energetic hackers and taken up by fanatics with time to burn. The tools were tricky to use, but enabled gamers to do the extraordinary: create their own *Doom* levels. Soon BBS's were bombarded with levels. Of the countless thousands made, most were pretty bad, but some showed a degree of creativity and invention that surpassed the original levels.

"People who were able to create levels with those *Doom* editors will be shocked when they see the *Unreal* editor. This is the *Microsoft Word* of 3D editors. It's really easy to learn." — *Mark Rein of Epic*

The next wave came with *Duke Nukem 3D*'s superb *BUILD* editor, whose ease of use was startling, particularly since it was dealing with some pretty advanced concepts. A *Duke* level is made up of several contiguous "sectors" comprising the floor, the ceiling, and the space between. That space between is separated by walls, which have their defining limits at "vertices." You basically draw a three dimensional space along the X, Y, and Z axes, then fill it in with textures, shading, lights, and sprites.

But things got tough with *Quake.*

The good part about *Quake* is that *QuakeC,* the programming language at the core of the game engine, is wide open to hacking. The result is that "mods" can easily be created to add just about anything to the game, from new super weapons to bad guys that look like Sailor Moon to "QuakeBots" that act like human Deathmatch opponents. You can essentially build a whole new game right on top of *Quake.* The bad news is that level creation is a bitch. First, this is *true* 3D (unlike *Duke*'s "2 1/2 D"), so you're dealing with many, many more variables.

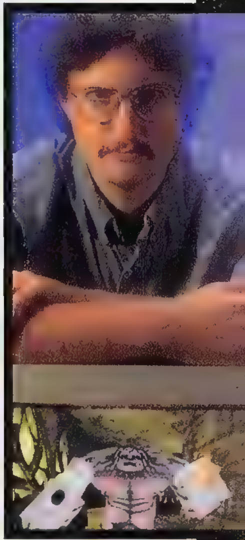
Still, the possibilities are immense, since the world can support about 10,000 large polygons with a continuous mesh skin *plus* countless light sources. While in *Doom* or *Duke* you would create a sector with lines and vertices, then define textures on them, in *Quake* you define the walls, floors, ceilings, and everything else as separate, solid objects. A *Quake* level is built with convex polygons of solid space. *Duke*'s model of simple sectors (build a box and hang a texture on it) crumbles when you move to true 3D.

Worse, unlike *Duke, Quake* didn't come with its own editor, so it was left to hackers to come up with tools such as *Worldcraft, Thred,* and *Quest* to enable users to make their own *Quakes.* Having to manually light source each level, and then go through a lengthy compiling stage, makes this tough going for all but the most devoted.

But all this will change if *Unreal* lives up to its promises. Epic's Mark Rein claims the Win95-native *Unreal* editor will have all the power of a major CAD program, yet also be the easiest world creation tool ever created. The editor, which will most likely be sold separately, will allow you to build wireframes, work with textures, light source, and populate levels with true 3D sprites. "It's so sophisticated, yet so fast and easy to use," Rein observes. "People who were able to create levels with those *Doom* editors will be shocked when they see the *Unreal* editor. This is the *Microsoft Word* of 3D editors. It's really easy to learn."

And an old timer is also set to show the young'uns how to make a custom game. *Jack Nicklaus 4: Golden Bear Edition* is coming, and after spending a few hours with its course designer, I can tell you it will be the same monster the original was.

Making a good course (which is an art form) is simplified by the addition of Wizards, but the real power is in the free-form mode where you can lay out an entire course, then go in and warp the ground. By forming simple shapes, then adding "handles" to them, you can create intricate course patterns and terrain changes. And a palette of up to 200 objects and grass types is at your disposal. With a 3D window open the whole time you're building, you can keep an eye on the course as it takes shape and even walk through it in semi-real time.



T. LIAM MCDONALD is the all-knowing god of gaming. He also writes about computers, literature, and horror for numerous mags.

Customizing games is time-intensive stuff, but the payoff is oh-so-satisfying. As more tools such as *JN4* and *Unreal* hit the market, with an eye toward the average gamer and not just the hardcore hacker, custom world building will probably become as much a part of a game's appeal as playing the game. After all, nothing you colored when you were a kid ever looked this good, even when you *did* stay inside the lines. b

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Product Information Number 275

A TAX UPON YOUR HOUSE

UNCLE SAM LOOKS TO MAKE A BUCK ONLINE... AT YOUR EXPENSE

April 15 rolls closer and my stress level rises.

The government's at it again. We saw this coming two years ago when the first talk of secure servers hit the headlines. Secure servers, even if only in theory, meant Internet commerce wasn't far away. And don't think Uncle Sam is willing to turn his old money-grubbing back on any commerce. To the government, commerce means revenue, via sales tax for all the lovely things you snatch up off the web. And heck, in a few states, the government went a step further and tried to charge ISPs sales tax on its subscriber base. And then a few other states offered incentives to lure technology out of those regions and into theirs. It's a nasty business, taxes.

What happens if I, living in California (with no sales tax on electronic commerce), buy my CDs online from a business in a state with an Internet sales tax? Existing federal law says items purchased over state lines are sales-tax free. Hmmmm. Fact is, many states expect sales tax from online purchases and some even charge a higher rate on transactions made over the Internet. (Clearly, these are not states with much Internet traffic or patronage from online businesses.) There's also the probability that your state charges different rates for different types of purchases: software and other data forms vs. books, clothes, and airline tickets...

If I own a business which adheres religiously to tax codes, I'll need a team of brainiacs just to follow the absurdly fast changes in laws pertaining to the Internet. Or, if I ignore those tax codes (because they are changing absurdly fast), I'll have to hire a team of brainiacs to get me out of audit hell.

But with 1996 being an election year, the liberal techno weenies and conservative Luddite goons needed to appease the public. The conservatives started looking for tax breaks for new Internet (capitalistic) businesses and the rebels tried to stop them. But as it turns out, the rebels were also looking for a way to win the libertarians (who happen to have a lot of money in technology that accompanies their liberal views). So, you can imagine, taxes are one of the rare issues that shared support from both sides of the fence. Even after the elections, tax breaks and incentives were supported by both Democrats and Republicans. One house, united under Microsoft, with the desire to spread technology to all ends of the earth.

Senators Ron Wyden, D-Oregon, and Chris Cox, R-California, proposed legislation prohibiting new state and local taxes on the Internet, including new sales and usage taxes. The bill also demanded that Clinton make a serious effort to develop a plan of attack for Internet commerce taxes. Experts say that by the year 2000, $7 billion dollars will be spent online. Without a plan, chaos is easy to anticipate.

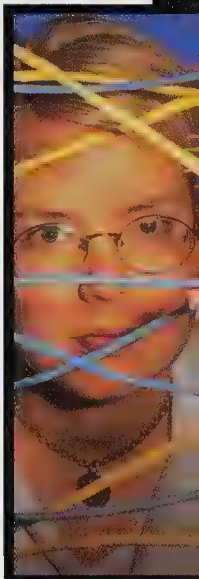
But the White House has a plan. In a bold move, it is "recommending" an electronic "free trade zone" to prevent new taxes or import duties on Internet transactions. Clearly, this plan—summarized as just "stay out of the way"—represents no revolutionary leadership, but still, it does favor electronic commerce. Typically, the one time the government wants to stay out of the way it just happens to have insurmountable effects on the American public. Whatever!

> In a bold move, [the White House] is "recommending" an electronic "free trade zone" to prevent new taxes or import duties on Internet transactions.

Then there's the ISP issue. Florida wanted to tax its ISPs. Other states retaliated saying that they wouldn't. The Interactive Services Association, which represents big players such as AOL, Microsoft, AT&T, and Netcom, had a lot to say about that. The ISA thought it fit to tax the subscribers (go figure!), arguing that revenue from connect time was far less than revenue from service fees and installation charges, therefore the amount the users would pay would be significantly smaller than the amount big corporations would pay. Uh, I think, proportionally, users also make considerably "less" money than big corporations.

Still, 'tis the season... Prepare to stand and deliver your slice to Sam, regardless of the myriad hoopla over state and federal regulations on Internet taxes. But this year, at least there are tons of resources online to help you out. In fact, you can get all the forms online! (Of course you won't be able to e-mail them back... how would you attach receipts? As GIFs?)

- **www.irs.ustreas.gov** The IRS, you know who they are. And unfortunately they know who you are, too.
- **www.taxprophet.com** It's quirky, but there's scads of info here. I'm especially fond of the wizard GIF. It's worth a peek just to see the goofy graphic.
- **www.hbpp.com/weekup/weekup.html** CPA's weekly headlines... and man, are they interesting. (This is actually a very well-organized and useful site.)
- **www.ypn.com/taxes/** How to file, where to get help, presented in a smooth, crisp layout.
- **nestegg.iddis.com/nestegg/** A slick magazine all about taxes, with features, news, and issues aplenty.
- **www.ml.com/personal/taxes/index.html** Merrill Lynch to the rescue with an armory of tax-related reference materials, including the skinny on new laws.
- **www.taxcast.com** It has lots of info, but not too much to make your head go dizzy, and it's updated weekly.
- **www.scubed.com/tax/tax.html** The Taxing Times even has Canadian information, as well as the usual U.S. info.
- **www.uni.edu/schmidt/bookmark.html** And if none of these suits your needs, this site has hundreds more links to all things relating to taxes (neatly organized into bite-sized tables).



SHEL KIMEN (kimen@well.com) has spent more time online than is reasonably healthy for one person and dreams in hypertext.

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Product Information Number 230

THE MOTHER OF ALL BOARDS

INTEL'S NEW NLX STANDARD IS THE SHAPE OF THINGS TO COME

Just in time for Mother's Day, the PC industry is making it easier to upgrade your mother... er, your *motherboard*, that is. A new motherboard standard known as NLX will bring long-needed improvements to the design of future desktop PCs.

Today, most PCs contain motherboards that conform to the ATX, LPX, or Baby AT standards. ATX is the most recent standard, and it still offers a good balance of cost, size, and expandability. LPX, on the other hand, is a 10-year-old standard that's certainly showing its age. New technology will be increasingly difficult to implement on LPX motherboards.

NLX is a similar configuration for low-profile desktop and minitower systems, but it offers several important advantages: more room for internal components, more room for external I/O ports, superior cable routing, and much better serviceability. NLX should make it a lot easier for you to upgrade and maintain your future PC.

Although IBM made some important contributions to NLX, Intel and Microsoft have been calling the shots on PC standards for several years now—even though neither company actually makes PCs. Intel is a major motherboard supplier (as much as 40 percent of the market, by some estimates), as well as the dominant CPU supplier (80 to 90 percent). That gives Intel enough weight to make things such as NLX stick.

When you tear down an NLX system, the first thing you'll notice is the way NLX segregates peripherals from the motherboard. All internal devices—the hard disk drive, floppy drive, CD-ROM drive, and so forth—are neatly grouped at the front of the case, along with the main power supply. They're separated from the motherboard by a short riser board, and their cables plug into the riser. On the other side of the riser, the NLX motherboard plugs into a special connector.

In other words, there are no direct connections between the internal devices and the motherboard. Everything plugs into the riser instead. Right away, this eliminates a lot of messy cabling, but it also has some more important benefits.

That special connector on the back of the riser board is actually a docking port for the motherboard. You can insert or remove an NLX motherboard in seconds by sliding it horizontally into or out of the system. The whole thing rides on guide rails that make sure the motherboard docks properly with the riser.

> ... believe me, it's actually possible to upgrade your system without exposing family members and colleagues to the dark side of your vocabulary.

This means you can swap motherboards without disturbing your internal devices. You don't even have to disconnect the main power supply, because it's not directly attached to the motherboard. Depending on how the system is designed, you might not even have to open the case, because the motherboard could slide out like a drawer through a removable rear panel.

You might be thinking, "OK, that's cool, but how often does the average person swap motherboards?" Well, not very often if you're lucky, but that's not the only point. Think how much easier it would be to upgrade your CPU or add more RAM if you could remove the whole motherboard instead of fumbling around inside a crowded case. At last, you'll be able to snap those fragile chips into place without getting up to your elbows in ribbon cables. Apple has been using a similar motherboard design in some Macintoshes for years, and believe me, it's actually possible to upgrade your system without exposing family members and colleagues to the dark side of your vocabulary.

Intel's mechanical specs allow for some flexibility in NLX motherboard sizes. They can range in width from eight to nine inches and in length from 10 to 13.6 inches. However, the standard requires *all* NLX chassis to accept *any* NLX motherboard, no matter what its size. That means you can replace an NLX motherboard with another NLX motherboard of a different size, and it's guaranteed to fit inside your case and dock correctly with the riser board. Of course, it's electrically compatible, too, so your internal peripherals and power supply will work.

There's plenty of room for the usual ISA and PCI expansion slots, plus DIMM slots from one to 2.25 inches long. (DIMMs will soon replace SIMMs in most PCs.) In addition, there's room for an AGP (advanced graphics port) card and an SEC (single-edge contact) cartridge.

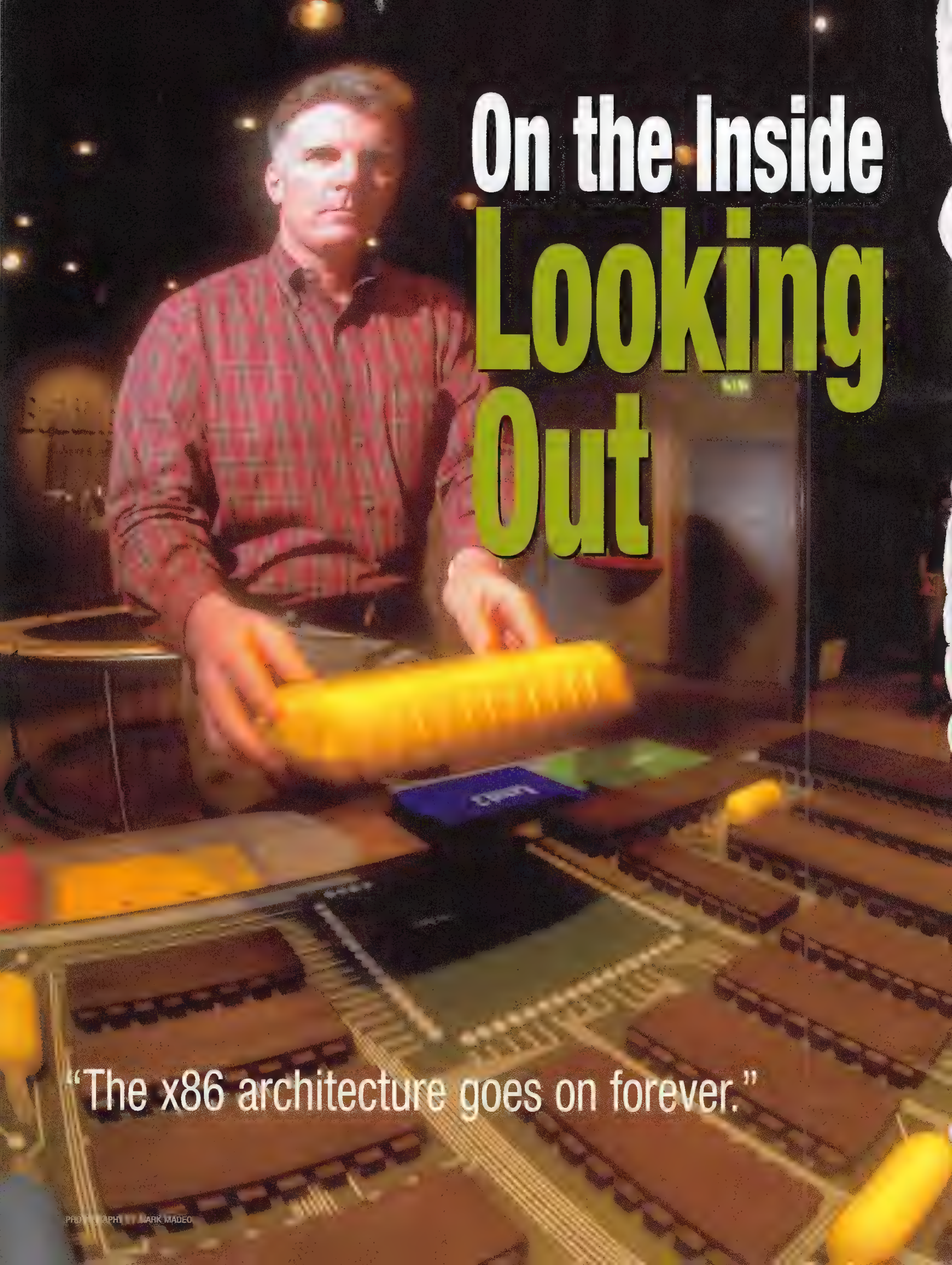
SEC cartridges are proprietary daughtercards that Intel will use for all future x86 processors and CPU caches. NLX can substitute a Pentium-standard CPU socket and a motherboard-based cache for the proprietary SEC slot. This would allow you to install any CPU chip with a Pentium-standard pinout, such as those made by Advanced Micro Devices and Cyrix. However, it's unlikely we'll see NLX motherboards offering *both* CPU options because they're electrically incompatible. So your choice of any new motherboard (not just NLX) will limit your future CPU options to either Intel or Intel's competitors.

Finally, on the back of the motherboard, NLX has 40 percent more room for external I/O connectors than LPX systems. This is vital because new I/O standards such as USB and IEEE-1394 FireWire won't catch on immediately, so PCs made during the transition period will need space for both the new connectors and the old standbys (serial, parallel, PS/2, etc.). NLX makes room by stacking a second row of connectors halfway down the width of the board.

NLX-based systems should begin appearing toward the end of this year. The new standard is virtually certain to catch on—not just because Intel is behind it, but also because it makes good sense. b

TOM HALFHILL is a senior editor at *Byte* magazine and the author of two computing books. He first became interested in computers during the disco era.

On the Inside Looking Out



"The x86 architecture goes on forever."

PHOTOGRAPHY BY MARK MADEO

Lip

THE BOOT INTERVIEW

When Intel speaks, people listen. After all, Intel has claimed the top spot as *the* processor powerhouse. There may be lots of fish in the pond, but when it comes to Silicon Valley, Intel *is* the pond.

Come swim with **MIKE AYMAR**, general manager of Intel's desktop products group, as he discusses the latest breakthroughs in technology, architecture, and connectivity, and reveals just what exactly, is *inside Intel.*

boot: With all the new technologies on the verge of launching—MMX, USB, AGP, FireWire—which do you think will have the biggest impact on PCs during the next year?
Aymar: There's going to be a wealth of things hitting the market. From Intel, we have technologies such as MMX, and later in the year we'll be introducing processors from our P6 family. We're supporting USB; we're supporting a new graphics interface called the Accelerated Graphics Port and have been working with independent hardware vendors on a chip that will plug into that. There's going to be tremendous improvement in 3D during the next year.

We're working on soft MPEG-2 decoders for DVD. We think our P6 family, will be able to decode MPEG-2 video, the AC-3 audio, as well as the copy protection decryption simultaneously... in software only, which will be mandatory for movies.

boot: The promise of DVD continues... So when do you think DVD will finally become a reality?
Aymar: I think it'll take off in 1997, and it will take off stronger in PCs than in consumer electronics players. It's just a perfect device... Unlike the CD-ROM—which was retrofitted into the PC after it was designed for audio, but luckily was a digital device—the DVD drive is being designed from the beginning to work in the PC as well as in a movie player. And I think because of that it's going to take off very rapidly.

boot: You're pretty much in the middle of everything, with the dream job our readers would kill for. What's the most exciting thing about your job?
Aymar: Well, I'm a gadget guy. I've got my cool little cellular phone and everything else. So I find it exciting just to work in the PC business—particularly as consumer electronics and PC technologies start converging.

You're going to see a lot of really cool stuff in the family room over the next year. Gateway is there with the Destination, and you're going to see several more products announced this year. The Destination doesn't let you do a lot yet, because it's not really strong in the control of consumer electronics gear, but I think that will come.

boot: So you think we'll see the computer become the center of the living room?
Aymar: Oh, absolutely. Because today, you have your TV and you have a radio receiver and a CD player and either a VCR or laser disc and they all have separate remotes, so interwiring them all gets to be a real mess, particularly if you want to have surround sound with all the home theater stuff. In the future you'll just have a PC and a DVD player.

boot: But won't merging the PC with consumer electronics appliances just create a hybrid that exposes the worst of both worlds?
Aymar: The world is going digital... Everything is going digital: video streaming, audio streaming. The PC is a tremendous tool for processing streamed data. In 1997, a midrange to high-end PC will be able to do all the decoding that you'd normally have to buy expensive stand-alone boxes for—it's a natural for handling digital data.

The other thing is control: As you put more and more devices in your family room, keeping track of them and all the remotes gets to be a disaster. The PC provides a single screen you can pull up that lets you control things.

boot: What's your take on a product such as WebTV, which tries to supplant the need for traditional PCs?
Aymar: Personally, I think it's a neat product. It's well-engineered and it's going to expose a new class of people, who haven't necessarily bought a PC, to the technology; get them excited about it... and whet their appetite to where they'll say, "Hey, this is nice, but I can't see everything on the web... I'd like to see more; I can't play games; my kids can't do their homework; I can't do my taxes, etc., etc." And so I think it will open up a few more people to the technology, people who may not have gotten excited about it before.

The only downside I see is the fact that you have to go to a proprietary service provider, which is another $30 bill each month. If you're a PC owner, you already have an ISP, but you can't use that one—you have to use WebTV. And I'm not sure that the first-time buyer is going to want to sign up for a $30 a month payment on top of their cable TV bill, phone bill, and everything else they have. So I don't know how it's going to play out.

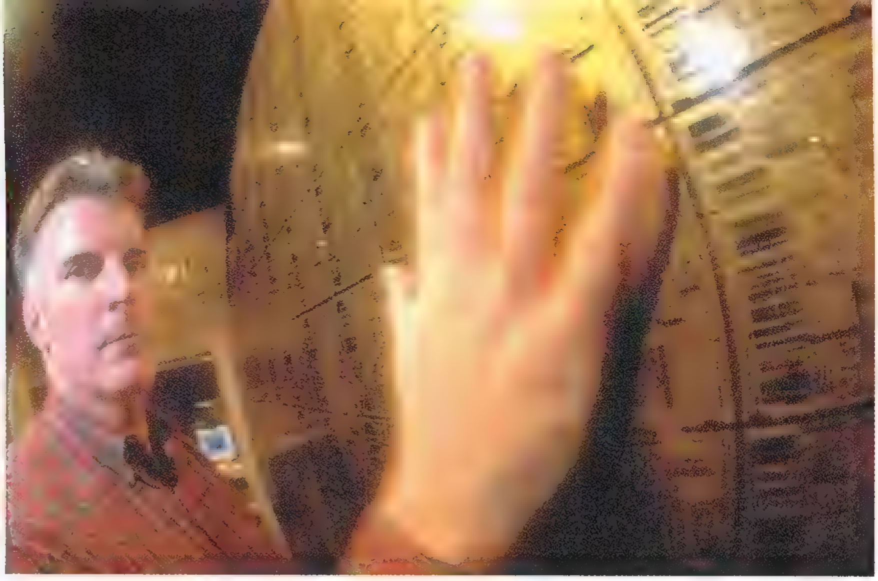
boot: Well, this always seems to be the situation with the Internet. Since all the information's popping fresh on the other end of the pipe, everyone assumes you can skimp and access it with minimal hardware. What's Intel's take on the Internet?

Aymar: I see the Internet as a tremendous conduit, but you still need that horsepower and the local storage of a true PC. A key concept we're working on is hybrid applications. These are applications that require local horsepower, both computing and graphics horsepower—plus the local mass storage of the PC—but also require the connectivity to talk to other people or to get access to data that's only out on the net. But because of the relatively narrow pipe that comes into most people's homes, you can't just transmit the amount of data it takes to load applications or to load complex 3D scenes in real time. You need to have those locally stored. You can either buy them on a CD or you download them once and then reuse them.

The other thing we're doing is working with the industry on guaranteed connections, with guaranteed latencies. It may not come under your $19.95 "all you can eat" Internet package, but by paying a little more, you'll be able to get a much better connection, much higher reliability, and lower latency, if you're interested in data streaming or video streaming.

boot: Intel went to great lengths to keep MMX hushed during the holiday shopping season. If I had just bought a vanilla PC and I found out that MMX was coming out two months from now, I'd be a little upset.

Aymar: Well, the consumer business is different... We're still learning about it. There are major selling seasons. But, in general, the consumer world is one of fairly rapid turnover, whether it's camcorders or VCRs or televisions or PCs. If you want to wait another three to six months, you can always get something for a lower price. So, in theory, you can wait forever and never buy anything because you're always waiting.



I find myself in this predicament... it's like wanting to buy a new camcorder. There are a bunch of nice little digital camcorders on the market. Do I wait or do I buy now? I buy when I'm ready, when I can afford it, and when I get the best value I can at that point in time. And I think consumers are beginning to look at PCs that way, just like they look at VCRs or camcorders.

In recognition of that, we are trying to be more sensitive to upgradability. So there will be—for people who bought high-end Pentium processor-based PCs this Christmas—an overdrive processor with MMX that will plug into their systems. And that will be available the first half of this year as well.

boot: How much longer is the life span of the x86 architecture? And where do you see its successor coming from?

Aymar: The x86 architecture goes on forever. There's the current 32-bit architecture, but there's a series of processors lined up in a landing pattern over the next several years that we have teams actively working on. And we have quite a few tricks up our sleeve that just dramatically improve performance of what you might consider the classical Intel 32-bit architecture.

We're also working on a follow-up architecture, which we'll probably start out in the business arena. Workstations are a breeding ground for cool new technology, which seems to get into the consumer space, especially in terms of graphics. We're working very closely with many workstation vendors and I think you're seeing the Intel architecture moving more and more into the workstation space, kind of entry-level and mid-range workstations becoming more and more based on Intel architecture.

> "We have to be really **careful** to synchronize the **hardware** development that Intel is doing with the **software** development that **Microsoft's** doing and make sure that we do that in some sort of **balance**."

boot: Does Intel offer "incentives" to developers for writing to MMX?

Aymar: With the early MMX developers, such as UbiSoft, we worked with them and came up with certain financial incentives so that they would be targeted. But that was an incentive program, as opposed to just a buy-out, if you will. It wasn't like we just said, "Here's a pile of money; do it for us."

The past is littered with situations where people with new hardware went out and paid a lot of money to the software community to port. But the software community didn't have its heart in it—there was no volume, there was no business interest for them to do it. So with the MMX, we set up these deals so there was an incentive for these guys to stay involved. And it's worked pretty well.

boot: The word is that MMX has a floating point problem. Is Intel doing anything to fix it?

Aymar: Both MMX and the floating point operation share registers... We did this on purpose, in order to get complete compatibility with existing operating systems and applications. However, there are programming protocols that have to be followed about saving the registers and restoring the registers. So, if you were using Windows 3.1, when you switched between floating point programs you had to do a lot of saving and restoring of registers yourself or else your two floating point programs conflicted and you wound up with data corruption. It's the same thing—whether it's two floating point applications or a floating point and an MMX application—you have to follow those same guidelines.

When you get to Win95, the world's a lot safer because this multitasking and switching is built into the operating system. But nonetheless, there is still switching going on. So it's not an errata or a bug, it's just the nature of programming... And it's always been the nature of programming. And only a very small percentage of people will even be aware of it.

boot: USB is Intel's solution to the driver problems that have haunted the PC platform from the beginning. Despite the hardware standard being ready, Microsoft did not implement USB support into the OSR/1 release of Win95 and will not offer upgrades to OSR/2. Basically, PC owners must wait until the release of Memphis, currently slated for this summer, to use the new peripherals. How does Intel feel about Microsoft's apparent snubbing of USB?

Aymar: We're disappointed that USB hasn't taken off more quickly.

We're overcoming that by working closely with Microsoft. But the thing is, we have to be really careful to synchronize the hardware development that Intel is doing with the software development that Microsoft's doing and make sure that we do it in some sort of balance. We're learning that neither their software nor our hardware can exist without the other.

Often, we get a bit out of sync and then one of us has to step in and help the other and vice versa. With USB, I think you've seen that.

boot: Which company yields more influence in the computer industry, Intel or Microsoft?

Aymar: I can't answer that! I have no idea. In different ways we both make a lot of contributions. We both have a lot of influence in the industry—and by the way, I'm not sure that Intel and Microsoft have more influence than, say, Compaq or Sony.

boot: Intel has plans to expand into the 3D accelerator market. With all your inside knowledge of the PC architecture, how does Intel's design compare to that of the current 3D cards?

Aymar: If you look—on paper—at all the things that will be available in '97, we think Intel's offering will be very competitive. On paper, we think it's the best, but a lot has to happen between now and then; Intel has to execute and everybody else has to execute.

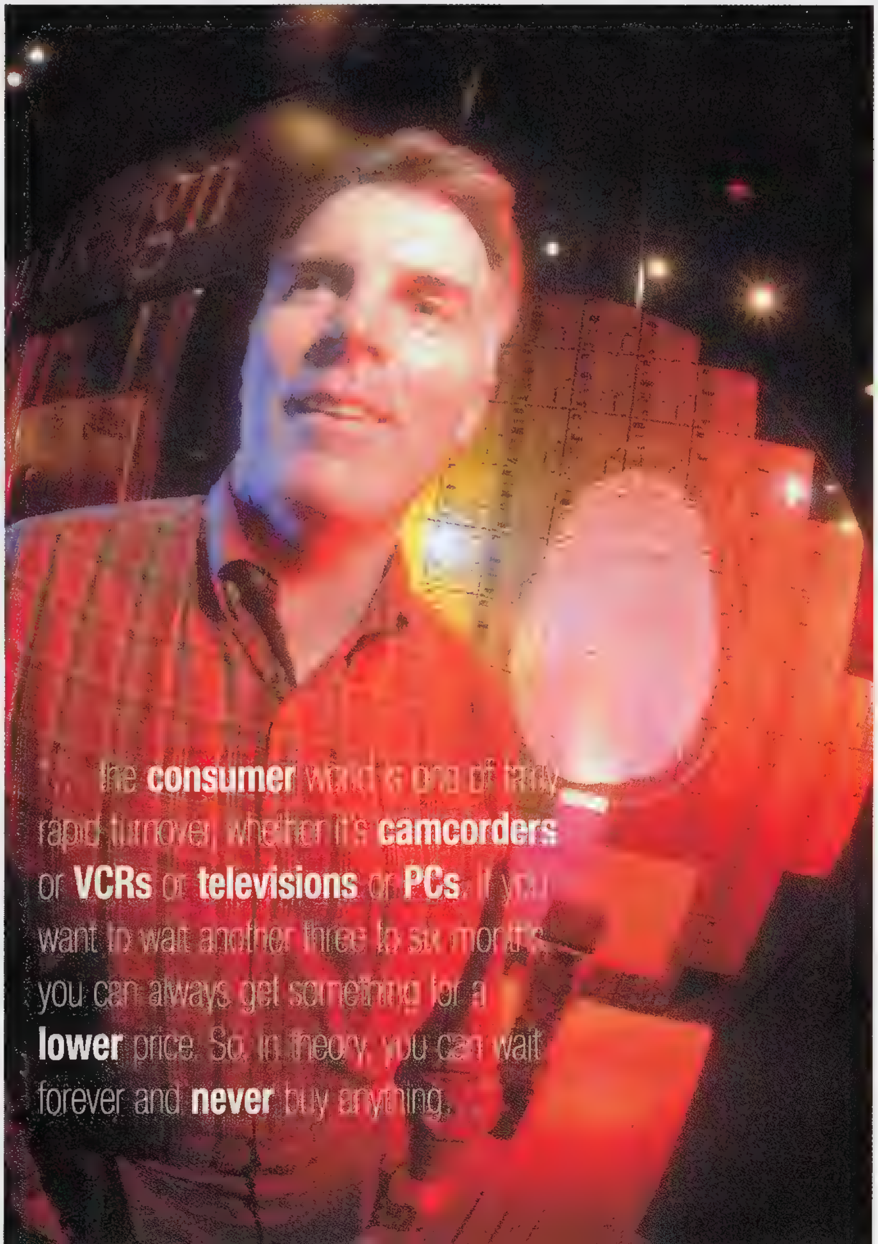
boot: Will Intel's next generation processors, with expanded instruction sets and surging output, ever obviate the need for a special 3D card? Or will there ever be a 3D card with the processing power to stand alone, almost like a PC console game system?

Aymar: It's like an engine and a transmission—you can't have a PC with only a microprocessor or only a 3D accelerator. These things need to work in balance and in harmony with each other. And if you look at a road map, it's all that either one can do to keep up with the other one. You have the microprocessor being mostly responsible for geometry and calculations of where things are in space, and you have the 3D accelerator responsible for rendering and managing all the pixels on the screen. I don't think that's going to change, because that symbiotic relationship is a key foundation of how PCs work.

So, we don't see the microprocessor absorbing the graphics accelerator or the graphics accelerator absorbing the microprocessor. We see them forging a partnership. This 3D vision requires that both continue very rapid performance improvements.

boot: At the end of the day, how important to Intel are computer games and the technologies that drive them?

Aymar: Entertainment is a big, big deal; it's very important to Intel. We're very focused on 3D; we're working on graphics, we're working on video, and in our labs we're working on the integration of those technologies so you can overlay video on top of 3D graphics. Then you can have video and graphics, all overlaid on each other. So the content suppliers can then do very, very complex and highly realistic games. I see those as the driving forces for consumer PCs. ▮



...the **consumer** world is one of fairly rapid turnover, whether it's **camcorders** or **VCRs** or **televisions** or **PCs**. If you want to wait another three to six months, you can always get something for a **lower** price. So, in theory, you can wait forever and **never** buy anything.

BY BRAD DOSLAND

DIGITAL SHOOT OUT

maximum pixel resolution: maximum
internal memory capacity in megabytes: total images stored internally: external memory options: lcd/led interface: auto focus technology: macro options: shutter speed range: minimum
manual exposure compensation: twain drivers: maximum color depth in bits per channel: lithium-

boot takes 6 of the **new breed** of **affordable** digital cameras **geared** for consumers and pits them **head-to-head** in a **face-off** to find the **best**.

A cantankerous old man might bitterly exclaim, "Back in my day we had Tri-X. It was black and white. It was grainy. And we *liked* it!" upon seeing the new breed of digital cameras that bridge the gap between unattainable professional tools and gadget toys verging on gimmick.

But are digital cameras inherently gimmicky? What about those handy 3x5 prints? And who really needs their pictures on a computer screen? Think twice before asking these questions.

Digital imagery is the future (and a big chunk of the present). Those old 3x5's you used to drop in the mail can now be e-mailed to everyone on your mailing list with the click of a button, without so much as a drive-through visit to the Fotomat. And if you really need something to stuff in the abandoned shoe boxes on the closet shelf (you know, the ones where your current collection of yellowing Polaroids dwells), you can always opt for a printer or take them to the nearest neighborhood copy shop for inkjet output.

And why stick with myopic 3x5 vision? Toss those images into any of the slide show apps that roam the shareware highways online and sell that Kodak Carousel projector at the next garage sale. If you don't have ample seating around the PC or are condemned to 14-inch hell, check out one of the digital cameras (such as the Sony DSC-F1 or Casio QV-300) that actually throw pix up on the monster monitor of your TV. Your eager audience can then park their fannies on the sofa and gaze lovingly at your escapades in 30-plus-inches of RGB splendor.

When you add up the hassle and cost of buying film then taking it to the one-hour joint (and the impending embarrassment of those monkey making dupes of your private moments), waiting around for the invariable two hours, only to then discover that only one picture has both of Uncle Ned's eyes open. Gahh! With a digital camera, it's click, preview, and download perfection.

But while digital cameras with the right stuff to go beyond mere gadget status are finally storming shelves with prices that make them accessible to anyone who once considered a good 35mm rig, they still represent a serious investment. Especially when you take into account the $13 price tag that dangled from the disposable Kodak camera (complete with built-in flash) that we used to take the "film" images for our tests. Yet that number

OLYMPUS D-300L

the resolve to get the job done

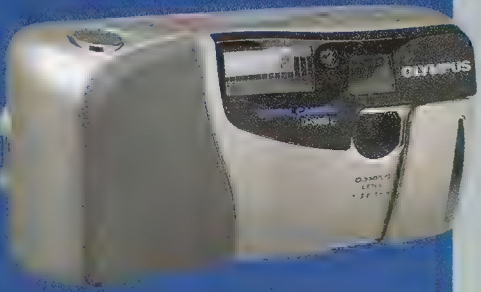
In the early days of digital cameras, the adage went that the three things to look for in a camera were: resolution, resolution, and resolution. Well, the D-300L from Olympus is all over that.

With the beefiest resolution (1024x768) of any unit in its class, the D-300L should be the choice of anyone even *considering* taking their images off the screen and onto paper. Cranked up to the roughly 200dpi resolution needed to smooth jaggies on medium grades of paper, the D-300L reproduces images in the 5x3.5-inch range (this is roughly double what some of the other cameras in this shoot-out kick out).

In addition to all this resolve, the ultra sleek D-300L sports the most ergonomic case design of this bunch. This may not seem important... until you're gripping the almost one pound box all day at your sister's wedding. And the prospect of one of those boxier designs slipping out of your grasp and onto the unforgiving concrete will have you making sure your credit card has a good buyer's protection plan.

And we speak from experience. Our first one took a six-inch fall and broke its foot neck.

Still, with a little talc and a firm grip, this Jetsonian camera sports all the features you'd want in a digital camera: both a range finder and a color LCD screen, a sliding lens cover that turns the unit on and off, a responsive shutter button, and excellent image quality (except for a yellow cast that is easily corrected.) The pictures benefit from the conservative 10:1 JPEG compression ratio and the decision to use autofocus instead of fixed focus (the latter of which *really* means everything is equally out of focus).



All in all, the Olympus is a very nice camera and should suit anyone who needs more resolve in their life and images.

boot verdict

$899
Olympus
800.622.6372
www.olympus.com

8

SONY DCS-F1

packing picture power in a pocket

boot KICK ASS! PRODUCT

Miles ahead of the pack on the "Wow!" scale, this little Sony (and it *is* the smallest unit in this shoot-out) does it all... and then some. The sturdy metal case is an anthem to industrial design and is guaranteed to draw a crowd of curious onlookers when you whip it out of your pocket.

And all this style doesn't come at the cost of functionality. The DSC-F1 does everything you could want in a digital camera (and a few things maybe you never thought of before) and does them well. Image quality, while not the highest resolution we've used, is superb. And the camera's myriad manual controls allow you the freedom to fine-tune your pictures exactly to your creative vision. The multi-tiered menus that you navigate on the color LCD screen are extensive and intuitive.

Toss in thoughtful design details such as a lens assembly that pivots 180° *and* flips the on-screen image to allow you to take self-portraits. Plus the built-in IrDA port transfers images, *without* a serial tether, at a rated 1.152Mbps! (Although you should expect much slower speeds in the real world.)

On the critical tip, transfers through the serial cable were dog slow, averaging some 30 minutes for 16 images at the camera's highest quality setting. And the thumbnails took more than 2 minutes to load. The only other negatives are actually mixed blessings. The LCD screen that you frame your shots with liberates your face from the camera, but can be hard to see in direct sun and the lack of a traditional range finder makes it the only show in town. And the rechargeable lithium-ion battery pack saves you from frequent Duracell expenditures, but cripples you if you're in the field without a wall socket to plug into.

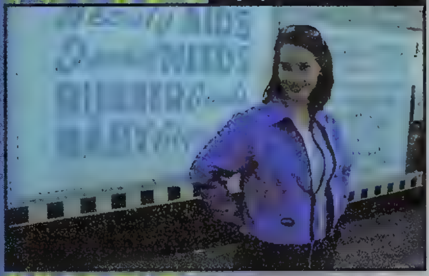
If these are the biggest faults we could find, you have to ask yourself, "Why don't I *already* own one of these?"

boot verdict

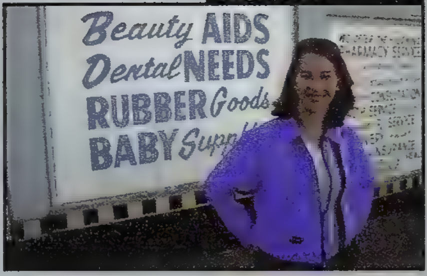
$849
Sony
800.352.7669
www.sony.com

9

Olympus D-300L


Beauty AIDS
Dental NEEDS
RUBBER Goods
BABY Supplies

Sony DSC-F1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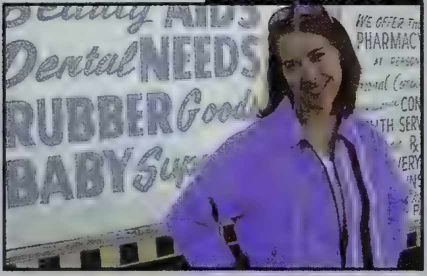
Canon PowerShot 600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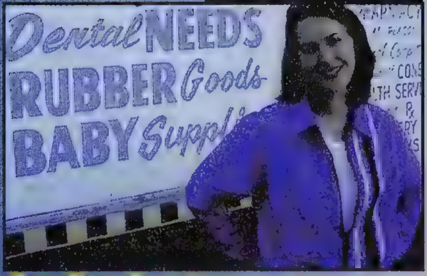
PHARMACY

Casio QV-300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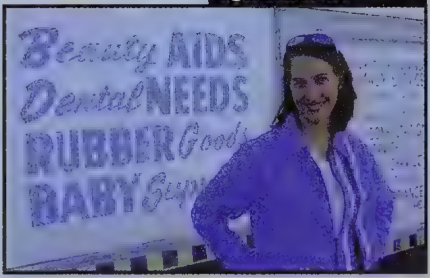
BABY Supplies

Agfa ePhoto 307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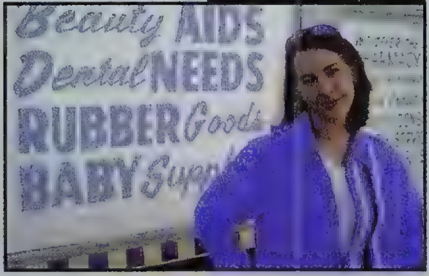
BABY Supplies

Kodak DC25


Beauty AIDS
Dental NEEDS
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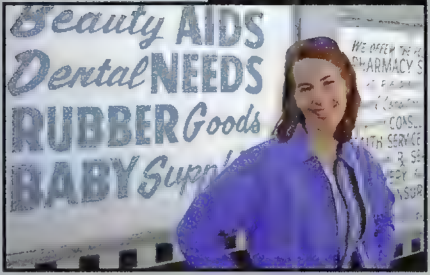
FLESH TONES

The most common subject matter in all of photography is people, so how well a digital camera captures flesh tones is critical. All of the cameras turned in acceptable results in direct sunlight, but the real test is the much softer (and complementary) light of open shade.

A blue cast is to be expected, but the overwhelming cyan pall of the Agfa ePhoto 307 is disappointing. Especially compared to the near-film quality of the Sony DSC-F1 image.

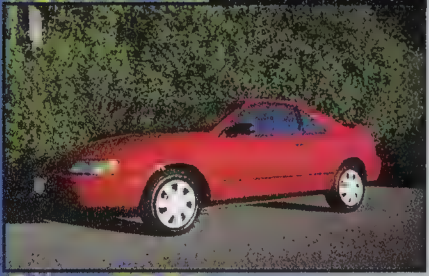
Film


Beauty AIDS
Dental NEEDS
RUBBER Goods
BABY Supplies
WE OFFER THE PHARMACY SERVICE

A digital camera's color repro is pushed to the max in bright sunlight. Toss in some contrasting colors on the opposite ends of the color wheel, and you've got a real ball breaker on your hands.

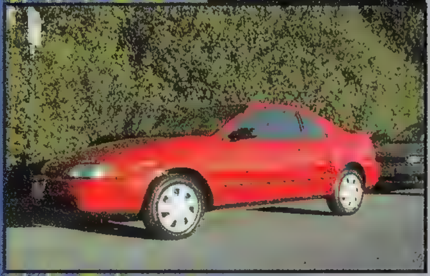
The orange car in the Casio QV-300 shows just how bad this effect can be. The Olympus and the Agfa cameras do the best jobs of chewing on this mixed plate of reds and greens and coming up smiling.

Film

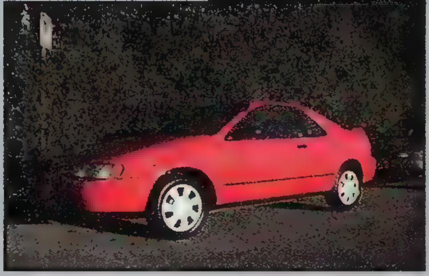


COLOR CONTRAST

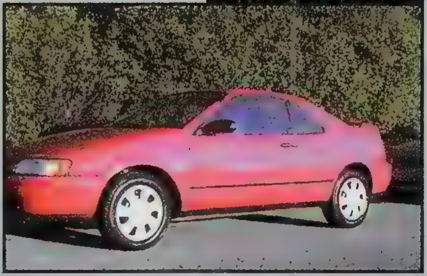
Olympus D-300L



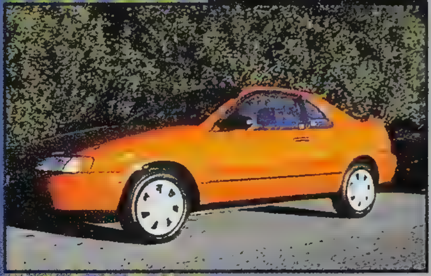
Sony DSC-F1



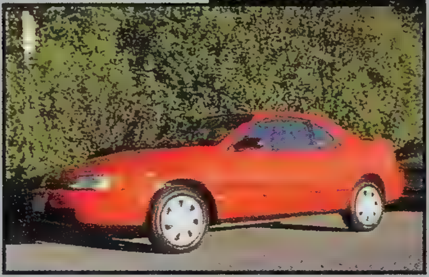
Canon PowerShot 600



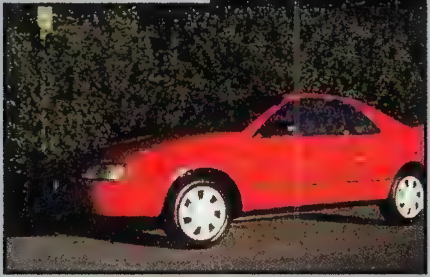
Casio QV-300



Agfa ePhoto 307



Kodak DC25



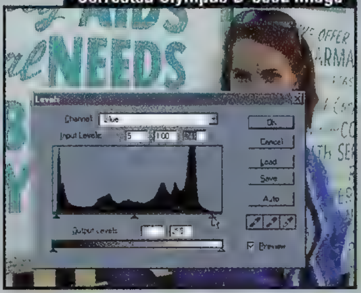
doesn't take into account processing costs, conversion to PhotoCD, and the turnaround time. There's no doubt that digital cameras are a worthwhile investment for anyone with a PC and even a passing interest in photography.

When deciding on a digital camera, you first have to decide what you'll use it for. If you'll just be e-mailing snaps of the toddlers to overseas relatives, resolution is of little concern. In fact, you'll want the smallest file sizes possible, unless Aunt Inka in Deutschland has a T1 line wired to her haus. In fact, if you're planning to use your images online in any capacity, maximum resolution will probably *not* be your driving factor. Over the wires, smaller is definitely better. Don't be one of the overenthusiastic webizens who gets their hands on a digital camera and instantly assumes that everyone who visits their site wants to invest mega minutes in downloading all the mega-pixel creations. They don't. Always downsample or thumbnail larger images.

If you want to transfer your pixel pleasures to a deadwood edition, you'll definitely want all the res you can muster. The Olympus D-300L is the current champ, packing an ample 1024x768 that could fill any 17-inch monitor worth its salt. Still, even at that resolution you wouldn't want to go much larger than 5x7 inches on a medium-grade paper without risking

EZ COLOR CAST CORRECTIONS

Corrected Olympus D-300L image



Forget those fancy services and esoteric utilities, perfect color is only as far away as the Levels command in *Photoshop*.

Simply go into each channel and pull the white point (the clear little arrow under the histogram) in to the left until the image data starts up, and repeat for the black point. (See dialogue box above)

The middle gray will automatically recenter itself for perfect pix every time.

CANON POWERSHOT 600

proving more *is* better

This is the monster truck of digital cameras. It does everything. It's huge—far and away the biggest in our shoot-out. Its boxy design cramps the hand and intimidates the faint of heart. This is *not* a camera for a Sunday drive... unless you're driving cross country without a notebook and need to take some 3,000 640x480 shots without downloading.

That's where the PowerShot 600 pays off. Packing the optional HDD PC card ($380), this Canon fires off image after image after image. With 170MB of storage, it's unlikely anyone will ever run out of room with this camera. For more modest appetites, 4MB cards hold 72 images.

But when you're adding up all these numbers keep in mind that this camera's image sizes are controlled by multiple variables. To milk every possible mile out of the PowerShot 600, you can turn the 832x608 resolution down to 640x480. And in the same way the Sony DSC-F1 varies image quality (and memory consumption) with varying degrees of JPEG quality—the Canon uses a similar scheme. Even then, image size is affected by image content. A JPEG of a blank wall is much more efficiently compressed than a snap of a Georges Seurat canvas. So, as with MPG in your typical monster truck, your mileage with the PowerShot 600 may vary.

Image quality is excellent, as one might expect from a company with Canon's reputation, although particularly hot highlights have a tendency to flare into surrounding regions. Still, colors are true and the glass lens delivers images sharp enough to cut a tin can in half.

One of the PowerShot's unique feature allows you to lock your focus on a centered subject by pressing the shutter button halfway, then reframe the image with the subject off-center but still in focus. This makes the trigger tough to get used to, but makes the PowerShot a more capable camera.

At the end of the day, the Canon PowerShot 600 is a rugged and capable specimen.

boot verdict

$949
Canon
800.848.4123
www.ccsi.canon.com

8

CASIO QV-300

image (quality) isn't everything

The QV-300 has a few distinguishing features, such as the largest LCD shot-framing screen of this group, a handy video-out port, a pivoting lens head, and flip-of-a-switch wide angle/telephoto lenses. Unfortunately, image quality is far and away the worst of the bunch.

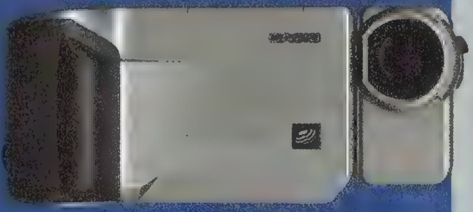
Pictures taken with the QV-300 are contrasty with poor shadow detail. Colors, when not taking on dramatic color casts from open shade shooting, are washed out. Bright highlights are blown out and bleed into surrounding regions. Solid regions pick up significant artifacts from the compression scheme and edges are jagged.

Low-light shooting results in unacceptable RGB mottling of neutral tones. And prepare to cope with this muck frequently, since the QV-300 doesn't have a built-in flash, unlike all the other cameras in this shoot-out.

The unit itself comes in a sturdy plastic case with a plastic shield protecting the flipping lens.

Without a range finder to peek through, you'll have to rely on the QV-300's big LCD to frame your shots. While subject to the same problems in direct sunlight as the Sony DSC-F1, the Casio LCD also suffers from slow refresh rates and slow shutter speeds, resulting in stuttering (roughly 4 to 6fps) on-screen images that blur unrecognizably while performing the simplest pans.

The coolest thing about the QV-100—aside from its ability to hold 64 of its crappy images in the 4MB of internal memory—is its ability to upload images from the PC, hook up with the Cassiopea HPC, and serve up coordinated presentations on a mondo TV monitor. This means making your pitch *without* lugging a notebook PC and monitor or overhead projector.



Still, there's little other reason to recommend the QV-300.

boot verdict

$899
Casio
800.435.7732
www.casio.com

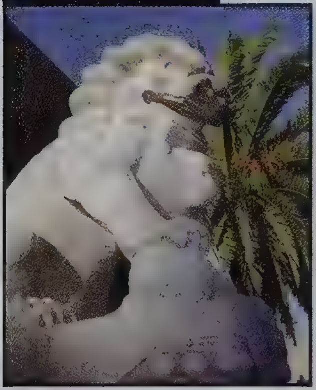
4

HEAD2HEAD	Olympus D-300L	Sony DSC-F1	Canon PowerShot 600	Casio QV-300	Agfa ePhoto 307	Kodak DC25
Price	$899	$849	$949	$899	$499	$499
Max Resolution	1024x768	640x480	832x608	640x480	640x480	493x373
Max Color Depth	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit
Internal Memory	6MB	4MB	1MB	4MB	2MB	2MB
Internal Images Storage	30 images	30 images	4 images	64 images	36 images	15 images
External Memory	none	none	4MB PC Card (72 images) +PC Card HDD	none	none	2MB PC card (14 images)
Other Res/Mem Settings	120 images @512x384	58 and 108 images at higher JPEG ratios*	ranges from 4 to 36 images based on JPEG/res combo	192 images @320x240	72 images @320x240	29 images @320x240
Interface	LCD	on-screen	LCD	on-screen	LCD	LED
Built-in Flash	yes	yes	yes	no	yes	yes
LCD (Size)	yes (1.8-inch)	yes (1.8-inch)	no	yes (2.5-inch)	no	yes (1.6-inch)
Range Finder	yes	no	yes	no	yes	yes
Focus	auto	fixed	auto	fixed	fixed	fixed
Lens	5mm	8mm	7.5mm	eq47/106mm	6mm	6.5mm
Macro	yes	yes	yes	yes	no	no
Shutter Speed Range	1/8-1/500	1/7.5-1/1,000	1/30-1/500	1/8-1/4,000	1/8-10,000	1/30-1/4,000
Max Aperture	2.8	4	2.5	2.8	2.8	4
Manual Exposure	no	yes	yes	limited	no	no
Software	PhotoDeluxe	PhotoStudio	PhotoImpact Tranxit Pro	PhotoDeluxe QV-Link	PhotoDeluxe PhotoWise	PhotoEnhancer SE PowerGoo LE
Size (inches)	5.75x2.25 X2.75	4.4x3.1 x1.6	6x3.5 x2.25	6.5x2.8 x1.75	5.5x3.25 x2	5.25x2.8 x1.6
Weight	14.6 oz.s	10.9 oz.s	1lb. 5.3oz.s	12.1oz.s	13.3oz.s	9.6oz.s
Battery	(4) AA	Lithium-Ion	Ni-Cad	(4) AA	(4) AA	(2) 3V Lithium
Other Features		IrDA transfer; TV-connector; 4fps mode pivot head	Parallel port docking station; b/w text format audio notes	pivot head TV-connector		plastic LCD shield
boot Verdict	8	9	8	4	8	6

notes: * All images are 640x480, capacity is increased by applying an increasingly lossy JPEG algorithm

DIRECT SUNLIGHT

Film

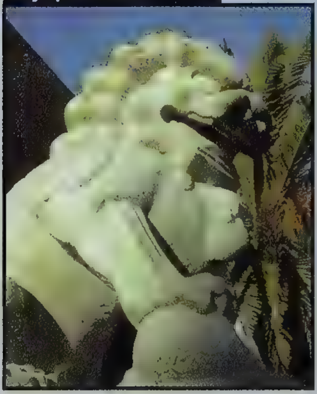


Even in the seemingly easiest of tests, truths are revealed. Notice the diversity of blues in which the various cameras record the sky.

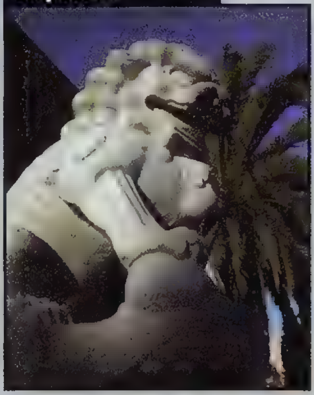
From the yellow cast of the Olympus D-300L to the splotchy blue mottling of the Kodak DC25, each sees the hue differently. The directly lit statue also reveals how each camera handles the harsh contrast of direct sunlight. Note the lack of shadow detail in the Sony.

This is a tough category to call, but based on accuracy to the film image, the inexpensive Agfa ePhoto 307 gets the nod.

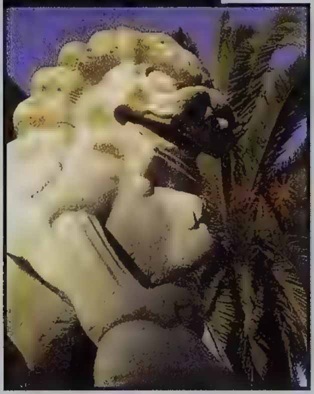
Olympus D-300L



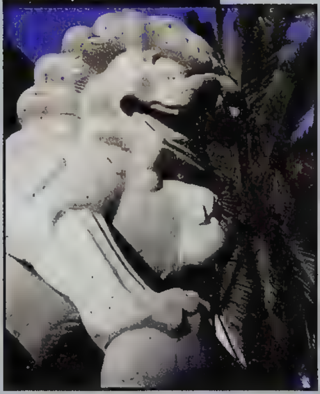
Sony DSC-F1



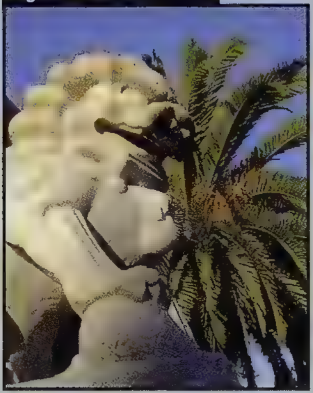
Canon PowerShot 600



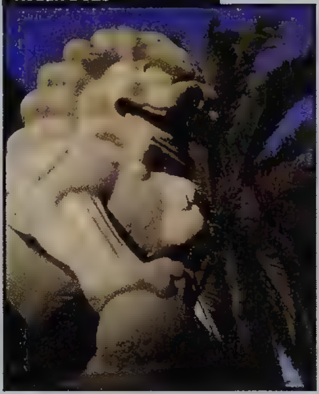
Casio QV-300



Agfa ePhoto 307

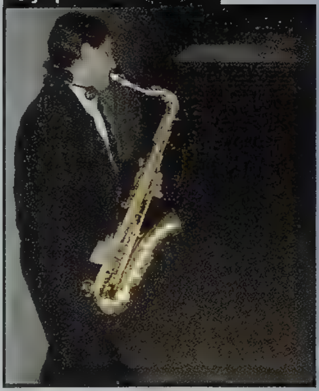


Kodak DC25

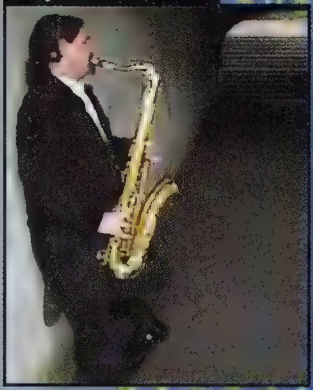


EXPOSURE LATITUDE

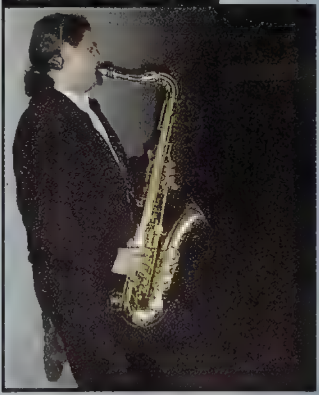
Olympus D-300L



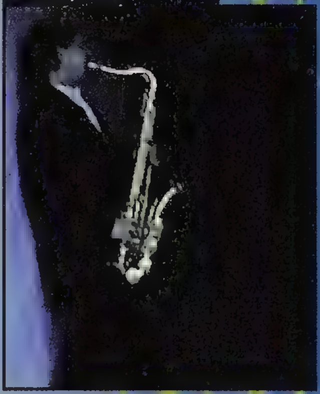
Sony DSC-F1



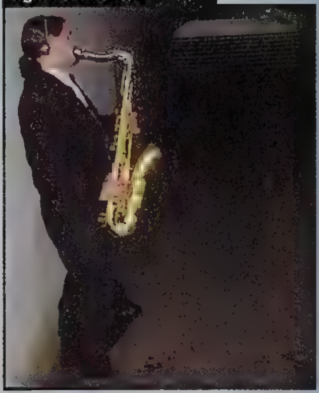
Canon PowerShot 600



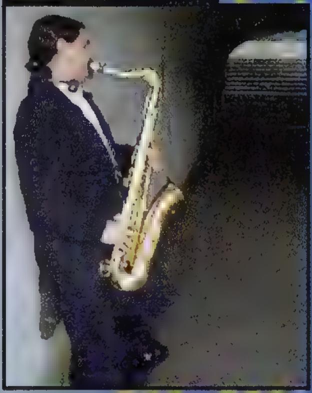
Casio QV-300



Agfa ePhoto 307



Kodak DC25

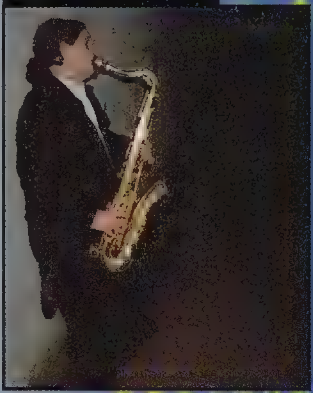


Many digital cameras actually exceed their silver-halide counterparts in this category. Latitude is the ability to acurately capture a broad range of intensities. The human eye does a much better job than any camera.

This image was taken in an underground walkway. The sax player is lit by a combination of ambient light and fill flash (when available). The real test is in the tunnel opening some 20 yards away.

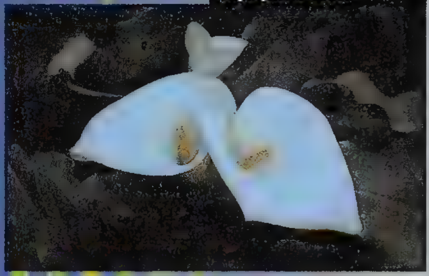
And the run-away winner is the Sony DSC-F1. The Kodak DC25's RGB mottling is unacceptable.

Film

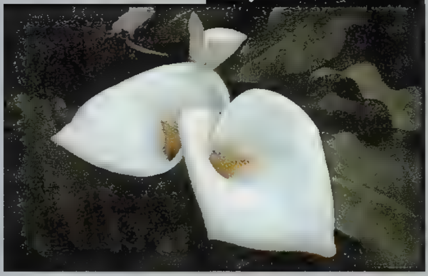


maximum pixel resolution

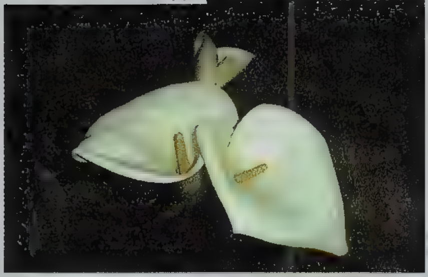
Olympus D-300L



Sony DSC-F1

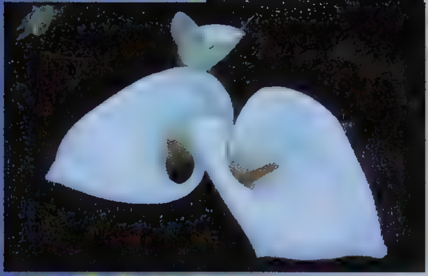


Canon PowerShot 600

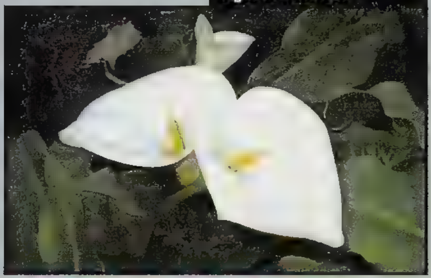


memory

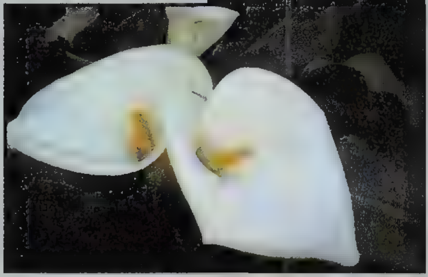
Casio QV-300



Agfa ePhoto 307



Kodak DC25



NEUTRALS IN LOW LIGHT

memory options: lcd/led interface

Seeing how half the world is always shrouded in darkness and so many who are in the light cower indoors, a digital camera's ability to render images in low light conditions is especially critical.

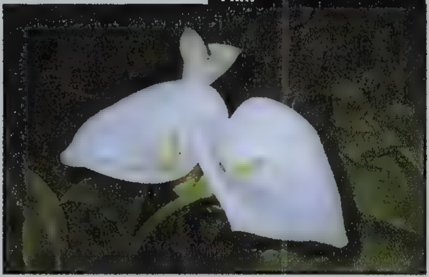
Many CCDs simply omit color info in low light. Others mottle the RGB channels, trying to make sense of the input.

Adding a flash, particularly a fill-flash option, does wonders for problem exposures.

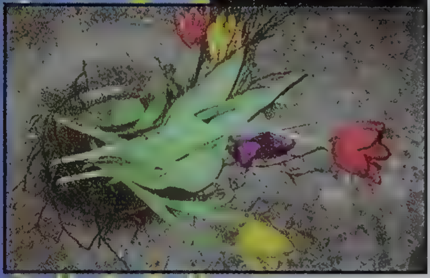
The winner in the neutral tones has to be the Agfa ePhoto 307 with its perfect rendering of greens via fill flash.

The color test winner is the Sony DCS-F1, which turned in better results than film!

Film



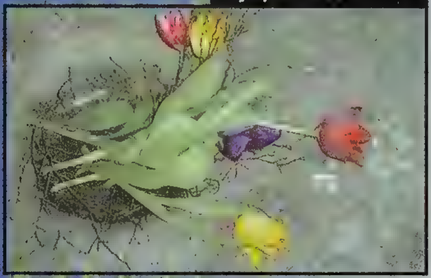
Film



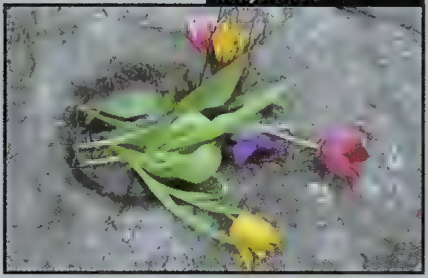
speed

COLORS IN LOW LIGHT

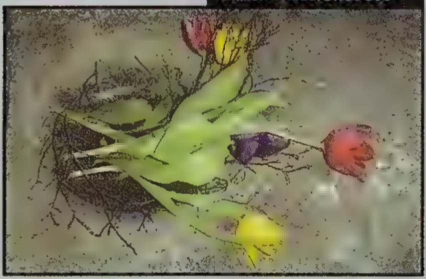
Olympus D-300L



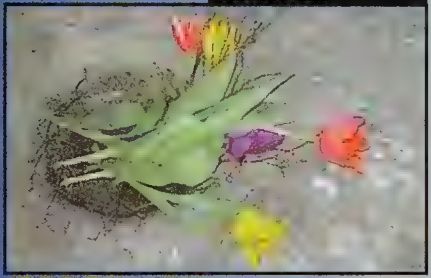
Sony DSC-F1



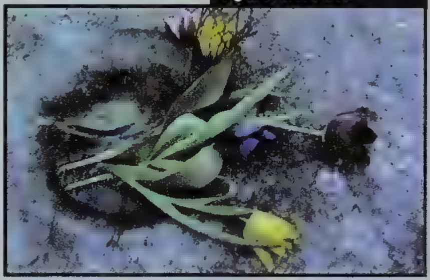
Canon PowerShot 600



Casio QV-300



Agfa ePhoto 307



Kodak DC25

The Kodak DC25 only holds 15 images internally and this was the 16th test.

depth in bits per channel: lithium-severe jags. Specialty papers, such as those from 3M designed specifically for printing photographic images, allow you to cheat down resolutions. And Adobe *Photoshop*'s bicubic interpolation feature allows you to upsample images with minimum artifacting.

"Artifacts" are the mysterious clumps of color in digital images that occur when processing leaves holes in the image for an algorithm to fill in.

But lest you think your artifacting fears end with upsampling... beware. All of the CCD-based cameras in this shoot-out store images in JPEG format and each one makes different trade-offs when it comes to compression ratios. An aggressive ratio may pack more images into that internal memory, but this convenience comes with the promise of increased JPEG artifacts. You'll definitely be able to tell the difference between a 10:1 ratio, such as the Olympus D-300L's, and the Kodak DC25's 30:1 ratio. Some cameras allow you to pick your poison and manually set the level of JPEG compression, such as the "economy," "normal," and "fine" settings on Canon's PowerShot 600.

Both ratio and resolution are sacrificed in the name of efficient storage in the cozy confines of a digital camera's internal storage. The cameras in this shoot-out range from 1MB to 6MB of internal memory, but that doesn't always dictate their internal capacity, which also factors in ratio and resolution of the images. The ability to selectively delete images is critical to this internal memory management. And this ability goes hand in hand with the presence of an LCD screen to preview images.

Also helpful in stretching the memory barriers is what Kodak calls "digital film." This is usually a PC card of flash memory to which the camera directly writes images. Such cards can be yanked once filled in the field and another card can be inserted. These range from 2MB to 6MB and more exotic options go beyond that. The Canon PowerShot 600's slot accepts a 170MB HDD card that stores more 24-bit images than the provided nickel cadmium battery pack will muster.

Ultimately, your digital camera choice will be based on your own personal needs. Still, certain constants such as resolution, image quality, and overall versatility will need to be considered before ponying up the plastic for your venture into digital camera nirvana. b

AGFA ePHOTO 307

the highest quality box since the Volvo

Out of the box, expectations for the ePhoto 307 were low. After all, there's none of the whistles and bells that adorn the other offerings in this roundup. No LCD screen. No microphone for recording audio notes. No pivoting head for... well, we're not really sure what that's for. At first glance someone who saw you using the ePhoto 307 might assume it was just a big ol' point-and-shoot film camera.

Wrong!

The boxy ePhoto 307 surprises with its superb image quality and solid performance. Our 16 test images, when downloaded into the provided *PhotoWise* software, took a mere 1 minute 15 seconds to download—compare this number to the 20 minute and 30 minute time spans required by the Casio and Sony respectively. This is indicative of the kind of performance Agfa, a company much-respected for its films and photographic goods, demands of the ePhoto 307 and also of the kind of performance you can expect in the field.

Special algorithms developed by Agfa efficiently map images into the limited color spaces and optimize the palettes for their most likely destinations: a computer monitor or inkjet printer. Images from the glass lens are sharp and tricky exposures are handled with élan. In low-light situations, the automatic flash does an excellent job of balancing fill with ambient light.

Still, holding back on the frills has allowed Agfa to tag this contender with a $499 price tag. Tasty!

Unfortunately the lack of an LCD screen means you can't delete specific images and once you've burned through 36 snaps you're done.

ePhoto 307
AGFA

There's no option for external memory on the ePhoto 307.

But don't judge this box by its cover, the proof's in the images and the ePhoto 307 certainly impresses.

boot verdict

PRICE $499
COMPANY Agfa-Gevaert
PHONE 800.685.4271
URL www.agfa.com

8

KODAK DC25

master of mediocrity

Kodak's latest has all the makings of a great digital camera: built-in LCD screen for framing shots and viewing previously captured images; a PC card slot that accepts flash memory cards, which act as "digital film"; and the reputation of the Kodak name. But anyone who's tried Kodak's previous forays into the camera realm (with the exception of the spunky DC20) know what *that's* worth.

Very little. And that's what the DC25 delivers. Very little raw resolution (493x373), in fact, the lowest numbers in this shoot-out. A very small LCD screen (just 1.6 inches), again the smallest in this roundup. The 2MB of internal memory only holds 15 images at maximum resolution. And this Kodak has no manual exposure compensation abilities.

You won't discover the worst thing about the DC25 until you're out in the field and the batteries crap out. It requires special (and expensive, to the tune of some $20) 3V lithium batteries that you won't find at most corner drug stores. I had to find the nearest RadioShack to feed my power needs.

All bashing aside, image quality (given the resolution) is surprisingly solid. The auto exposure is good, generating accurate colors in a variety of lighting conditions. The only exception being occasional RGB banding artifacts inflicted

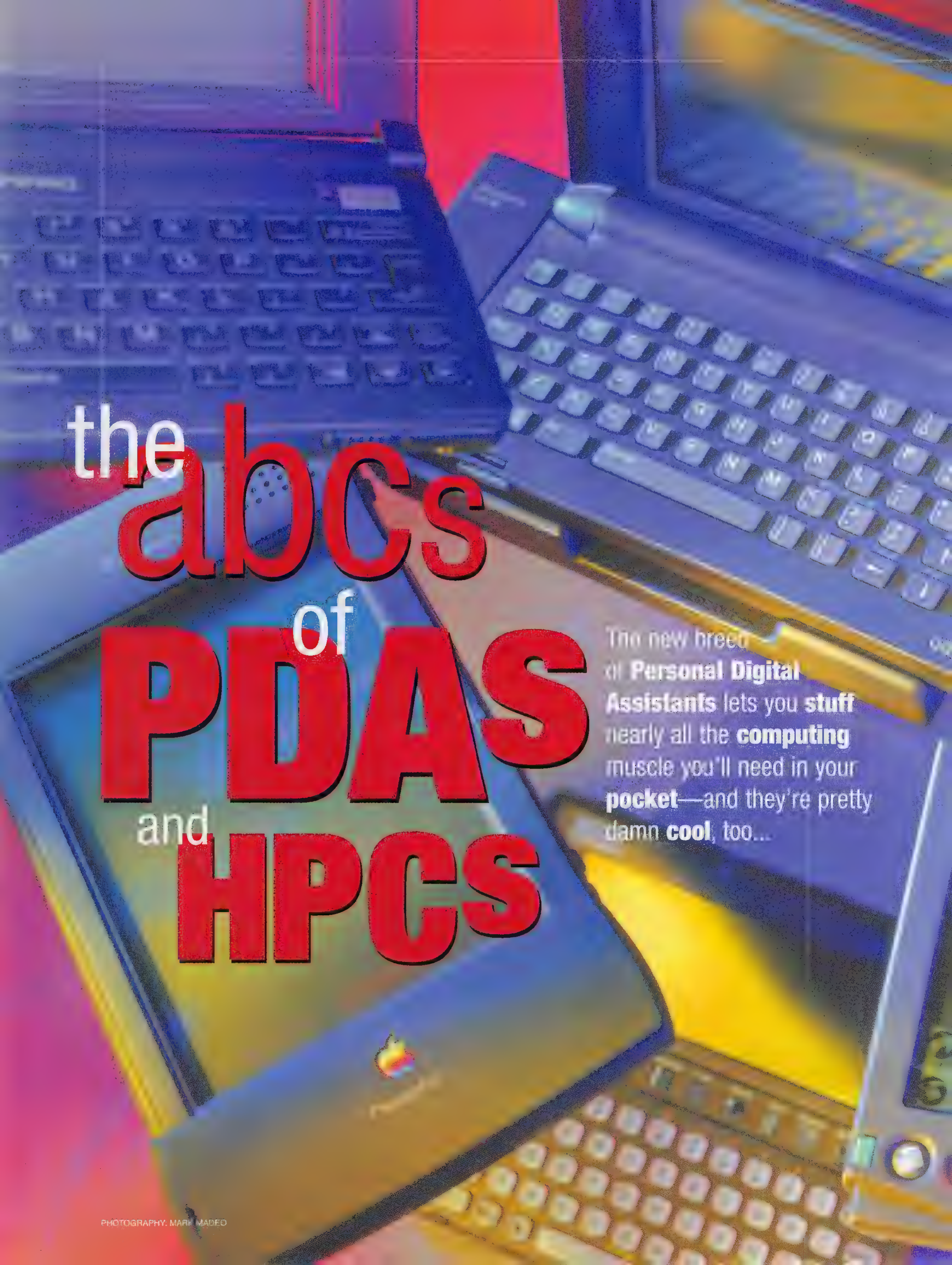
by the aggressive 30:1 JPEG compression ratio.

Still, with a sticker coming in under $500, generally acceptable image quality, and enough cool features to satisfy the Q in you; the DC25 is a nice little camera.

boot verdict

PRICE $499
COMPANY Eastman Kodak
PHONE 800.235.6325
URL www.kodak.com

6



the abcs of PDAS and HPCS

The new breed of **Personal Digital Assistants** lets you **stuff** nearly all the **computing** muscle you'll need in your **pocket**—and they're pretty damn **cool**, too...

PHOTOGRAPHY: MARK MADEO

BY NED GASKINS

Marketing types have traditionally called these devices "PDAs" (for "Personal Digital Assistants"), a phrase scientifically designed to lessen expectations.

And considering that most of the old-guard PDAs were little more than electronic rolodexes with a built-in calculator, that's a pretty accurate term. But Microsoft's new Windows CE OS makes it easy to crank out tiny black-and-white Wintels. Now the world can raise those expectations and call these pocket-sized wonders Handheld PCs.

Although PDAs have been around for a while, few manufacturers or software publishers committed to them. Their nonstandard operating systems made it risky for software designers to invest much time in them, and meant that potential PDA manufacturers had to invent both the machine and the OS (which, as IBM has proven, ain't easy). CE delivers the stability and standardization necessary for third-party software to flourish and competing manufacturers to push the platform.

Still, even before Microsoft's entry, there were some real successes. Both the Psion series 3a and the Hewlett-Packard 200LX fostered amazing user loyalty and, four years later, are still impressively capable computers. The HP200LX is actually an 80186-compatible DOS-based PC and feeds on the enormous libraries of older DOS software. The Psion 3a—according to many sources the current leader in PDA market share—supports an open, full-featured programming language that has given rise to a booming cottage industry of shareware Psion programs. Some are amazingly sophisticated, running the gamut from mortgage calculators to *Links 386*-like golf games and even a recreation of the classic *Little Computer People*.

Thanks to CE, though, the new HPCs are already proving to be third-party magnets. Surprisingly good handwriting recognition software, GPS-based mapping products, wireless modems and more are in the works. And the flow should only increase as HPCs gain acceptance. Don't get me wrong. These new CE machines can't replace a good notebook PC. But they represent a tangible step toward waterproof, shock-resistant mainframes that we will someday soon strap to our wrists.

The Best CE-based Handheld—The Philips Velo 1

It's worth emphasizing that, at this stage, all the CE-based HPCs are more alike than different. The major differences lie in their processor choices, connectivity solutions, memory configurations, and aesthetic look and feel.

With that in mind, the Philips Velo 1 is the most impressive of the CE handhelds. Its MIPS R3910, a 32-bit RISC processor, obviously makes a difference in performance. Timed search-and-replace tests in *Pocket Word* and calculations in *Pocket Excel* put the Velo ahead of the crowd. The differences aren't huge—seldom more than a second or so—but the Velo's consistent edge is certainly worth noting. The Velo 1 also boasts 8MB of ROM (a must for the resource-hungry CE), and can be purchased with either 2MB or 4MB of RAM.

Oddly, the Velo doesn't have a PC card slot. To add PC cards you must pop for the optional V-Module external card dock. The Velo *does* support additional memory through two mini card ports on the bottom of the unit, though.

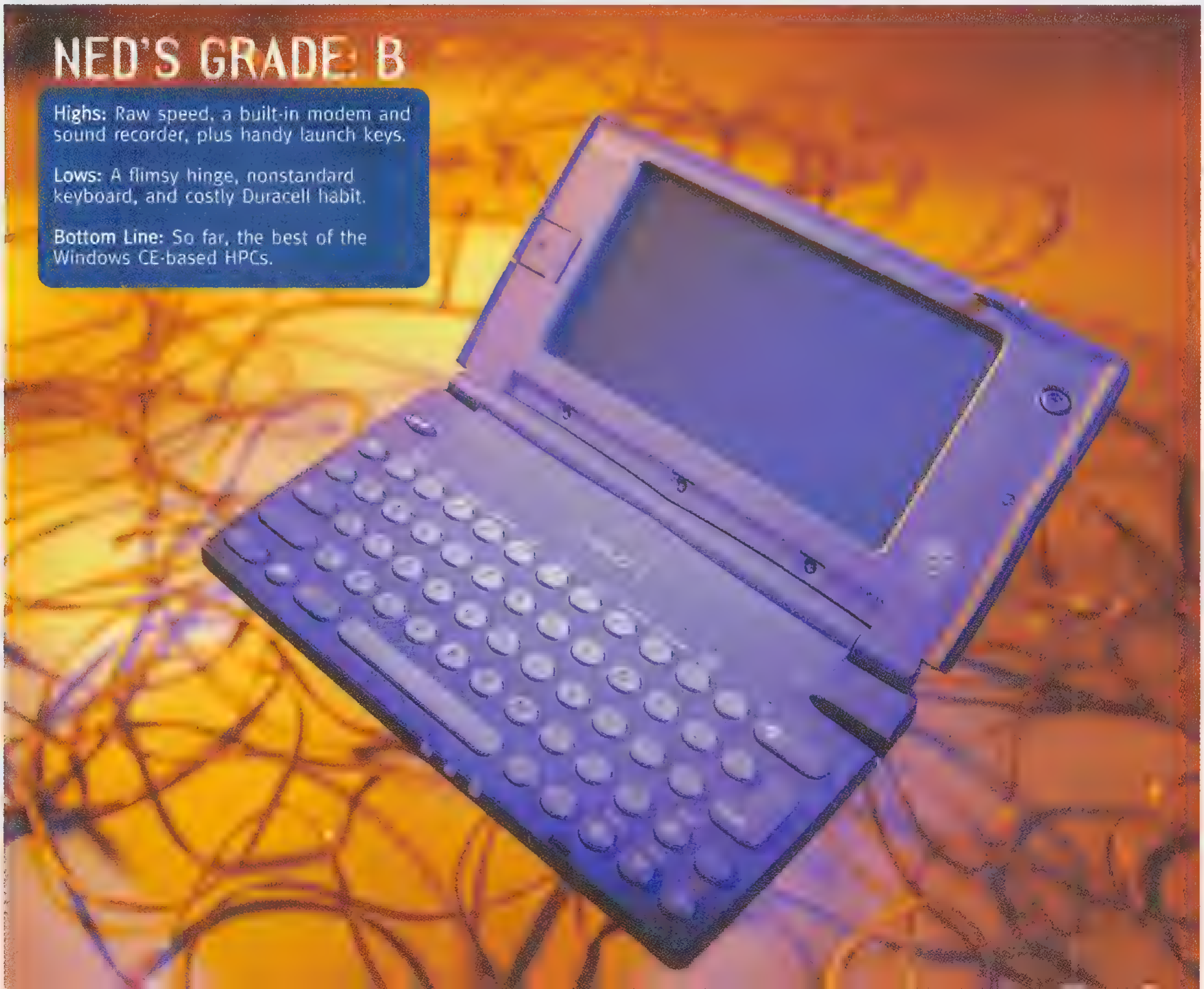
But the most common resident of PC card slots is modems and the Velo 1 comes with a 19.2Kbps v.32bis modem built-in. The modem connector sits flat and out of the way when not in use. To get online, just flip the door open and jack in.

Another great add-on is a digital voice recorder that lets you record up to 16 minutes per MB of available RAM. It kicks ass when you're documenting important things, like where you parked at the airport. And you don't even have to open the unit; just press the little nipple above the stylish Velo 1 swoosh and let it rip. But don't expect desktop sound quality; the mic and the built-in speaker have just enough muscle to get the job done. Still, you'll find yourself using this handy feature more often than you might guess.

One more plus is the dual-use numerical keys along the top row of the keyboard, each set up to launch specific applications when punched in combination with the Alt key. It's a thoughtful extra that beats the slower Windows CE launch options (double tapping, or the Start button) by a mile.

The Velo does have a few quibbling downsides, though. For one, its oval-shaped keyboard keys make for less pleasant touch-typing than more traditional keyboards (although, in truth, touch-typing on an HPC isn't much fun to begin with). It goes through a set of AAs every 15 hours (and you'll get even less time if you use the backlight), compared to 20 hours for the other CE machines; and its hinge feels flimsier than the others, which could mean expensive repairs down the road.

But it's the combination of performance and features that make the Velo 1 boot-Worthy indeed.

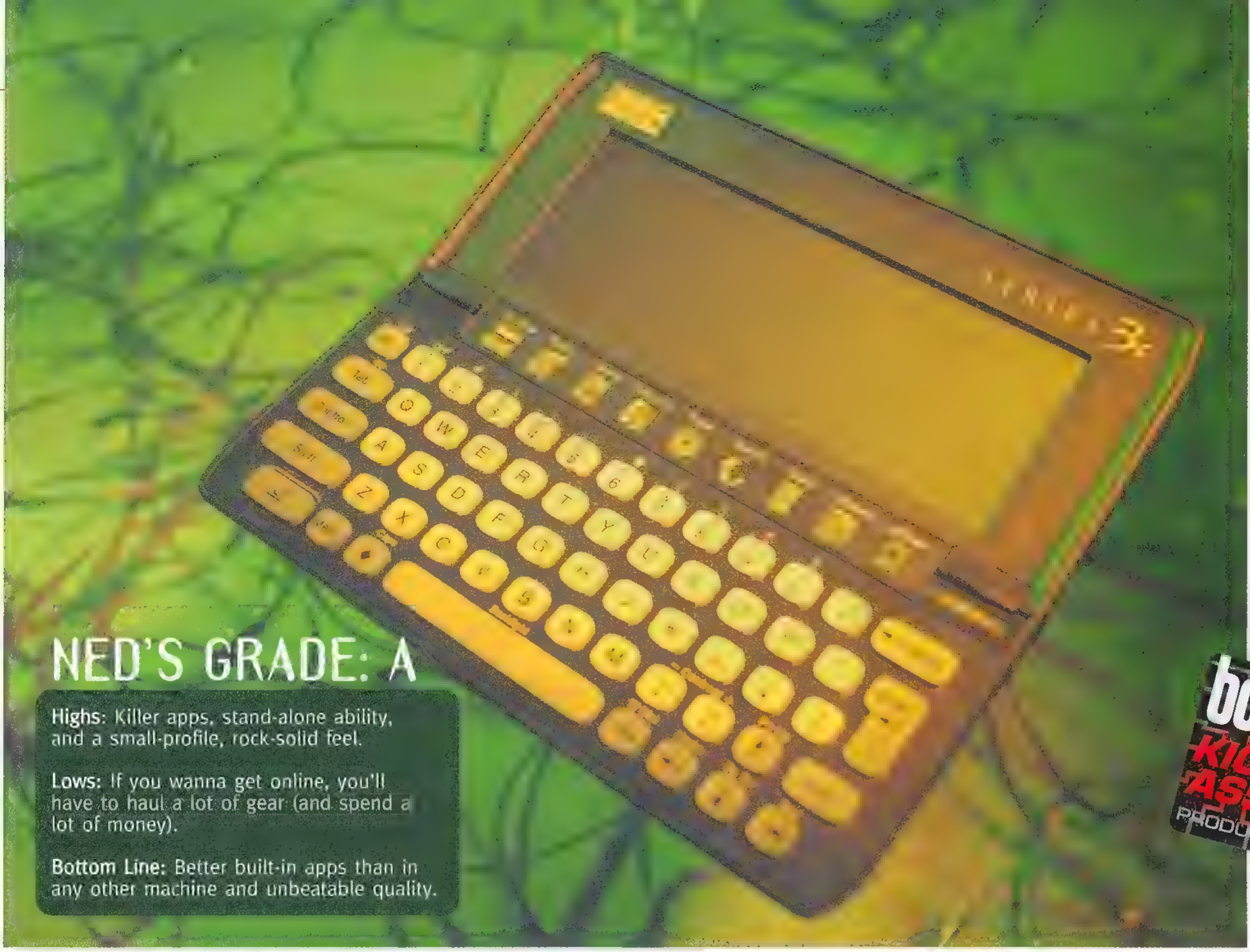


NED'S GRADE: B

Highs: Raw speed, a built-in modem and sound recorder, plus handy launch keys.

Lows: A flimsy hinge, nonstandard keyboard, and costly Duracell habit.

Bottom Line: So far, the best of the Windows CE-based HPCs.



NED'S GRADE: A

Highs: Killer apps, stand-alone ability, and a small-profile, rock-solid feel.

Lows: If you wanna get online, you'll have to haul a lot of gear (and spend a lot of money).

Bottom Line: Better built-in apps than in any other machine and unbeatable quality.

boot KICK ASS! PRODUCT

The Best Non-CE Handheld—The Psion Series 3c

Psion takes the prize, despite the fact that it's not pen-based, doesn't ship with PC-to-PDA linking gear (although it's available for $99 and works great), and its optional modem is big and slow. But CompuServe forums bustle with fanatically loyal Psion users swapping tips, homemade software, and stories of near-calamity ("My 3a fell in the Channel...") and salvation ("... and survived with all the data intact!").

First, there's the *feel* of the Psion—specifically, the new Series 3c. Smaller and lighter than CE HPCs, the 3c feels assuringly solid. It opens smoothly, revealing a nice keyboard, a crisp display, and a row of application-launching pads.

The 3c comes jammed with well-designed software. There's an impressive *Word*-compatible word processor (unlike the anemic *Pocket Word*, it spell checks, has a good thesaurus, and even handles TrueType fonts!); an *Excel*- and *Lotus*-compatible spreadsheet; a full-featured sound recorder and editor; and a world clock. Of course, you also get a database app, a notepad, scheduler, calculator, and a thorough file management program. Best of all, the 3c consumes only two AAs every 40 hours—twice the battery life of the best CE-based handheld.

Because it has won a large user base, there are plenty of professional software packages for the Psion, including *Automap* from Microsoft. And because Psion includes an open programming language authoring tool with its devices, there's no shortage of ingenious software for the 3c. You'll find 25MB of excellent freeware and shareware for the Psion on this month's *bootDisc*.

The fact that the 3c isn't pen-based is no problem to my way of thinking. The OS is incredibly intuitive: Icons represent the programs available, and highlighting an icon, then pressing Enter launches it.

The 3c is a true multitasking computer, and you can leap from one program to another, copying names from the database and pasting them into *Word* files, as easily as in Win95. It takes practice—but nowhere near as much as Win95 originally did.

The Psion Series 3c doesn't come with connecting PsiWin cables or software, so you will have to spend an additional $99 to sync up to the desktop. With them, popping data back and forth is pure drag-and-drop. The *PsiWin* software's translation filters let you move data between the 3c's built-in software and your desktop favorites. The IrDA infrared port is nice, though not rugged enough for major transfers.

The 3c *feels* like it was designed to stand alone—which can mean trouble when it's time to go online. The 3c sports two proprietary expansion slots, for SSD (solid state disk) memory cards in lieu of PC cards. So Psion designed a stand-alone modem for the 3c. It's battery powered and plugs into the 3c's RS232 serial port—but it's half again as large as the 3c itself, it's only a 14.4, and it costs a couple hundred bucks more. You could use any external modem with a serial adapter cable or use PC card modems with the optional PC card adapter unit. But this gets pretty expensive and nixes the portability you bought a handheld for in the first place.

Still, the 3c's built-in goodies, size, and feel go a long way toward overcoming connectivity problems. The Psion Series 3c is a straightforward portable computer, from a pioneering company in handheld computers, with enough standard software and third-party support to compete with any notebook.

The HP OmniGo 120

The OmniGo 120 just isn't as flashy as the other products here. While it's full-featured, including *Graffiti* handwriting recognition (the same system employed by the Pilot), *Pocket Quicken*, a Jotter app that works with either the keyboard or the pen-sensitive screen, and all the address, notepad, and scheduling functions you expect in a PDA, none of the software is especially exciting.

NED'S GRADE: F

Highs: Novel folding design works like a notepad or traditional PDA; full-featured software suite.

Lows: Hard-to-see display; cramped and confusing keyboard; no online capability.

Bottom Line: It's just a data bucket, but not nearly as elegant as the U.S. Robotics Pilot—so why bother?

The one neat feature of the OmniGo 120 is that you can use it as a keyboard- or pen-based PDA. Folding the keyboard back against the screen, you can rotate the display from normal to portrait, and you end up with a natural writing surface. For those who want pure pen-based power in their HPC, the OmniGo gets the keyboard out of the way entirely. Attempts to write on the screen of other machines are often thwarted, because the heel of your hand constantly hits the keys.

The problem is, the 240x240 display doesn't feature a backlight and is tough on the eyes no matter how you use it.

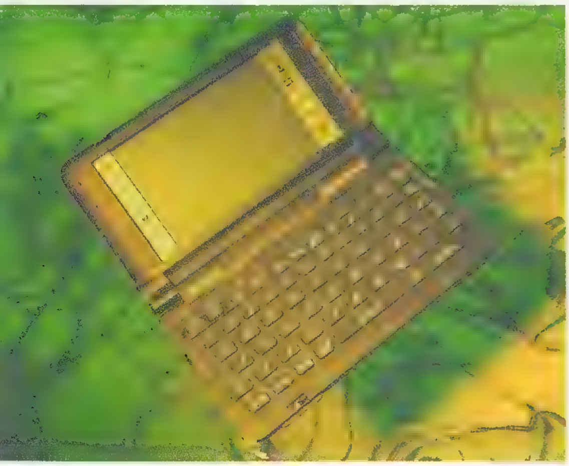
And the OmniGo hasn't implemented *Graffiti* as well as the Pilot. So to switch from writing letters to numbers, for instance, involves invoking a pop-up window that obscures nearly half the display screen and makes it tough to check your pen input.

The OmniGo 120 has a port for a single PCMCIA Type II card (SRAM and CompactFlash only), but no ability to get online and no infrared port.

Don't count HP out, though. Their much-loved 200LX is about to go Windows CE and will boast a full 640-width display with other features that may challenge the Velo 1 for CE dominance.

Sharp Zaurus 5800FX

Funny how fast technology changes. Two issues ago, the Zaurus 5800FX was deemed bootWorthy; in the current field though, it doesn't fare as well. But it's worth including in this roundup because, before the Pilot and Windows CE changed expectations about PDAs, Sharp was the lead dog. In fact, online Sharp vs. Psion battles raged endlessly, eclipsing any other products in terms of sheer fan support.



The Zaurus 5800FX is a focal points of all that user loyalty. It's a full-featured PDA, combining keyboard and pen input in a useful, if not ambitious, configuration. So while there's no handwriting recognition built in, you can make nifty maps and such by drawing on screen, then accompanying the drawings with text using the Scrapbook application. In fact, Scrapbook even contains ready-made stamps of gas stations, stores, roads, and other neighborhood landmarks. It's nifty, really.

Nifty describes the other software bundled with the 5800, too—not "powerful" or "intuitive" or anything like that, but certainly useable. The word processor can spell check and files can be cross-linked from one application to another. This lets you attach a spreadsheet to a note, then attach both to a contact in the database.

Still, the applications feel like what they are: proprietary programs unfamiliar to anyone used to working in full-sized PIMs, databases, and notepads. They're full of peculiar "Zaurusisms," and take a lot more getting used to than other PDA software.

The 5800FX comes with a 9600/2400 fax/data modem, which screws into the unit's left side. It's small and easy to attach, but slow. There's also a Type II PC card slot which supports modems up to 14.4Kbps, as well as memory upgrades. Among the bundled applications are faxing software, a limited CompuServe browser, a mail client, and support for an optional pager device.

And that's about all the software you'll get. Unlike the Psion, Newton, or CE machines, the Zaurus line never gained much interest from third-party software developers, and Sharp hasn't added very much to the shelves. So the Sharp feels like a hard-wired organizer, and not a *true* computer.

PC connectivity is handled by an optional *Zaurus Application Partner*, which includes software and cables to sync data with software such as *Act!* and *Schedule +*. There's also an IrDA infrared port for quick sync jobs, printing, and so on.

Compared to the other handhelds here, the Zaurus 5800FX feels like an older model, based on older technology. It's just not as polished as the new breed of handhelds, and doesn't hold as much promise.

NED'S GRADE: D

Highs: Plenty of built-in apps; comes with a fax/modem and good connectivity package.

Lows: Its proprietary design feels unfamiliar and has resulted in very little third-party software support.

Bottom Line: An old model that's been surpassed by new competitors.

the
abcs of
PDAs

The NEC MobilePro 400

At first glance, the MobilePro 400 looks pretty neat. It ships with a desktop-synchronization cradle, as well as an AC adapter to ease CE's battery drain. And the unit we tested included *Jot*, a pretty good *Graffiti*-like handwriting recognition program. Add to all this a chic design, and the NEC seems to be a real winner... on paper.

In practice, though, the MobilePro quickly comes apart. Running on NEC's Vr4101 processor, it's the slowest HPC we tested. It's so slow, in fact, that you'll often find yourself closing windows, waiting... then tapping the close button again, in case the command didn't get through. But now, you end up closing two windows instead of one. This happens *all* the time, no matter what you're doing, and you must learn to wait a few seconds to see if the MobilePro is going to do what you asked, or if it missed the pen tap and needs further prompting. This adds up to a real pain in the butt.

The touchscreen is imprecise, despite repeated recalibrations. In truth, this probably owes more to the slow processor than anything. But still, the MobilePro isn't as tap-sensitive as its competitors.

The rest of the feature list is common for CE devices: 2MB or 4MB of RAM, 8MB of ROM, runs nearly 20 hours on a set of batteries, built-in tinny sounding speaker, built-in IrDA infrared port, built-in Type II PC card slot (getting online at 28.8 is a snap), and a tolerable black-and-white display—although you'll definitely miss the backlight feature common to the other CE machines we tested.

On a positive note, the MobilePro's keyboard has a good feel, and the keys are well spaced.

Jot is nice, the NEC feels great, and the cradle and adapter are good inclusions. If you'd never heard of the Velo, and didn't realize how slow the NEC is, you'd probably be happy with the MobilePro 400—but that's what we're here for, isn't it?

NED'S GRADE: D

Highs: Nice docking cradle and AC adapter are included; good design and solid feel; *Jot* handwriting recognition program.

Lows: It's so slow that navigating is a real chore; no backlight; imprecise touchscreen.

Bottom Line: Despite some winning touches, there are better HPCs.

Compaq PC Companion 140

Our final CE HPC, the Compaq PC Companion 140, falls between the Velo 1 and MobilePro 400. Luckily, it falls on the Velo 1 side. It's a snappy performer, employing the same SH3 processor used so far by many of the CE HPCs.

It has all the better features you'd expect in a CE device: an IrDA port, a Type II PC card slot, a serial cable for desktop synchronization, and a 480x240 backlit screen. While the backlight is rather anemic, the screen is especially crisp and easy on the eyes, making *Solitaire* a pleasure, even on a night flight.

Beyond the standard Windows CE package of *Pocket Word*, *Pocket Excel*, *Pocket Internet Explorer*, the PIM suite, world clock, and so on; the C140 packs *Desktop-to-Go* (a translator for non-Microsoft apps) and *Mail on the Run*, which expands e-mail support. Better software bundles will mark the next generation of CE machines.

It would be interesting to try a handwriting recognition app with the Companion 140. The C140's touchpad seemed to be looser than the others, as if a bubble of air was trapped between it and the actual LCD screen. It didn't affect tap-and-drag operations, but...

On the aesthetics side, the Compaq is pretty buttoned down. It's solid, and the keyboard feels better than any of the other CE HPCs we've seen. The PC card ejector and battery cover are sturdy, and even the adapter hole is filled with a rubber plug.

The PC Companion 140 is a very competent machine. It does what it should, isn't flashy—kind of like Windows CE itself.

NED'S GRADE: C

Highs: Good screen, solid feel, and nice, responsive keyboard. Good performance, too.

Lows: It's not sexy, and could use some better [illegible]

Bottom Line: A solid HPC—not as cool as the Velo, but much better than the MobilePro 400.

The Newton Message Pad 2000

The Newton line has managed to snag rabid devotees despite several early missteps. Unique (until the Pilot) as the only PDA without a built-in keyboard, the Newton was at first plagued by lousy handwriting recognition and OS problems that would have killed other projects. But this PDA comes from Apple—all the reason Mac addicts needed to buy Newtons and stay true in sufficient numbers to propel the machine into its third generation.

The 2000 uses the very latest Newton OS, v.2.1, which brings with it better handwriting recognition, but it's still far from perfect. After using the 2000 for a week, I prefer the Pilot's implementation of *Graffiti*—a system I'd initially resisted. Why should I have to write a certain way? Because it works better, and in the end, is far less frustrating.

Right out of the box, the 2000 seemed to recognize my handwriting with about 65 percent accuracy. I trained and practiced so often that I felt like I was back in grammar school—finally giving up, preferring instead to tap out my input with the on-screen "keyboard". Yeah, it's slow. But not as slow as writing, correcting, training, practicing, correcting...

The Message Pad 2000 *does* boast the most impressive screen of any units here. It displays 16 grayscales, compared with the CE HPCs' four; it's big (almost twice the size of the CE handhelds); it has a brilliant backlight; and its touchscreen is spot-on accurate.

The 2000 also packs computing muscle, beginning with a StrongARM 110 RISC processor running at 160MHz—10 times faster than the previous Message Pad. There are also two Type II PC card slots, an IrDA infrared port, and a built-in microphone and speaker (both of good quality). The system ships with 5B of RAM and 8MB ROM.

The included software is also impressive. You get everything you'll need to word process, calculate spreadsheets, keep track of appointments and contacts, even draw diagrams and edit sound files. And there's robust Internet support, including TCP/IP access and a nice web browser.

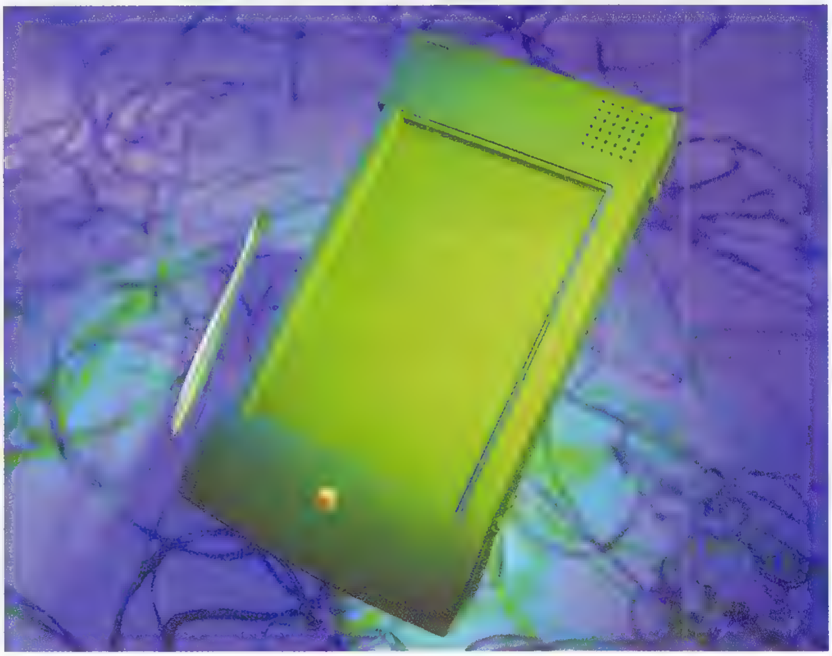
The 2000 is fun to play with, no doubt about it. And if you invest the time to get used to it, it does perform. But it costs $1,000, weighs nearly a pound and a half, and is far too big to fit in anyone's pocket. Cool, yes. But not so practical.

NED'S GRADE: C

Highs: Fantastic screen, powerful processor, and lots of impressive software

Lows: It's heavy, pricey, and bulky, and the handwriting recognition, while improved, still ain't perfect.

Bottom Line: If you can afford two handhelds, make this the second.



The Cassiopeia Connection

As this issue went to press, we saw some new gear from Casio that marked the first truly cool technology for the Windows CE HPCs. It's a little program called *QV-Link* and it actually lets you route the photos from your Casio QV-series digital camera through Casio's Cassiopeia HPC—and from there, the sky's quite literally the limit.

We didn't get the Cassiopeia in time for review, but it's nearly identical in every way to the Compaq PC Companion 140 (Casio makes both units).

But the real story here is the software, and the power that *QV-Link* puts in your pocket. With *QV-Link*, and the included mini-jack connector, you can link up to your digital camera and browse its contents on your PDA—even adding comments and titles to the photos, then assembling them, album-fashion, as a presentation. You can route the photos to any television set with an RCA-in jack and run your presentation full-screen, complete with titles, using the Cassiopeia as the control unit and reading notes from the HPC.

The guys from Casio also brought along a wireless pager that connects to the Cassiopeia and, using *QV-Link*, demonstrated their ability to zap instant photos from the camera through the HPC and up online only seconds after they'd been taken!

Sounds like a newsgroup in the making...

U.S. Robotics Pilot 5000

(see our exclusive review of the new PalmPilot model on page 85)

Regular readers of *boot* are no strangers to the Pilot, a big hit with just about everyone on the team and one of the most revolutionary products to come along in some time. It eschews the notion of palmtop as little desktop PC, adopting instead the idea of the data bucket.

Most of us use our desktop PCs for *real* work. So the most useful PDA is a very small one that we dip into the desktop data well in the morning, tote around during the day, then match new entries with the desktop, and call it a day. It's a simple idea, but one that changed the PDA forever.

So how does the Pilot fare as a data bucket? Damn well. The included software is capable, neatly ordering your appointments, contacts, and to-do items. The Pilot supports other applications, including a dizzying number of shareware and freeware creations—easily thousands of 'em (some 27MB of which can be found on this month's *bootDisc*). This is a real salute to the Pilot's popularity, as there are more Pilot apps already available than were *ever* created for PDAs such as the Zaurus.

Since the Pilot's designers didn't have delusions of replacing the desktop PC, they were free to make it small. Just a bit bigger than a pack of 100s (or playing cards, for you non-smokers), the Pilot is so portable that you'll never leave it behind.

The petite size is due mainly to the Pilot's lack of a keyboard. All entries are done using *Graffiti*, which assigns pen strokes to numbers and letters. It's really not too tough to learn, and once you've mastered it, entering data on the Pilot is probably easier than typing on an undersized keyboard.

The backbone of the Pilot system is the HotSync cradle. Just slip your Pilot into the cradle, press a single button, and your contact lists and other data are synchronized. Additional cradles aren't expensive, so it's easy to have one for home and one for work for the same Pilot.

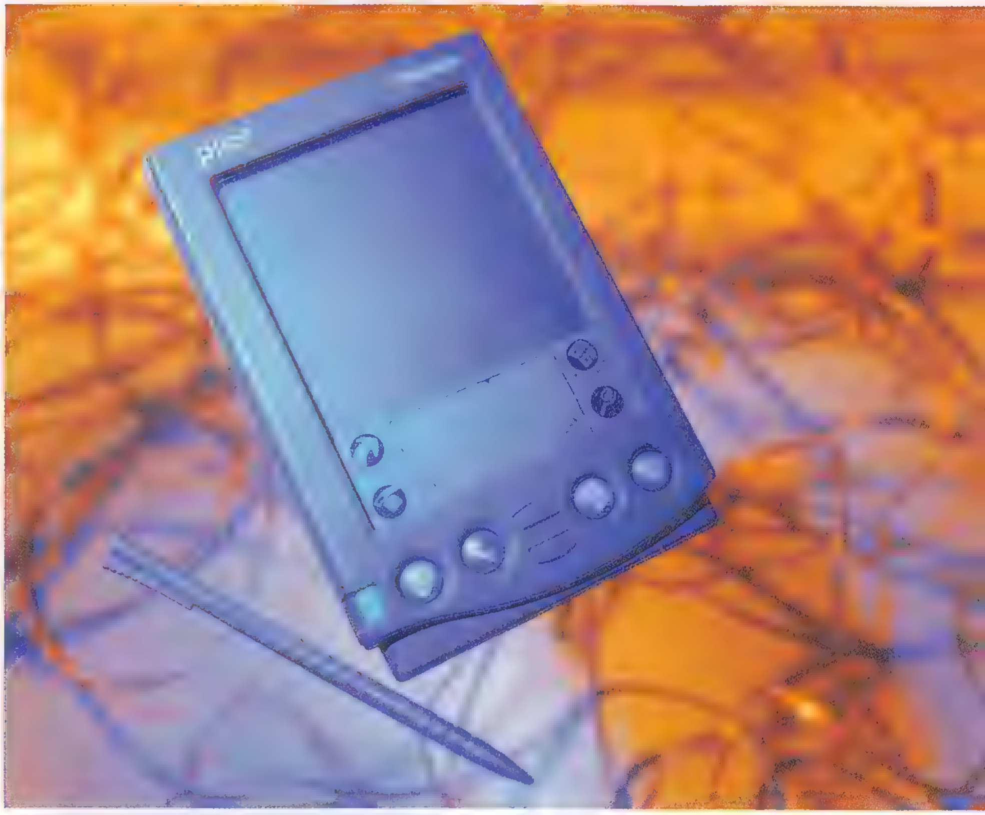
The Pilot does what it's supposed to do so well, it feels like wonderful largess when you use it to jot notes, or play a game of *Breakout* or *Tetris* on the plane.

NED'S GRADE: A-

Highs: It does exactly what it's designed to do, and then some. A no-brainer at $299.

Lows: No online capability in the current model, and lacks the full-function apps of the Psion 3c.

Bottom Line: Such a good PDA, it's easy to forgive the fact that it's not really a handheld PC.



Wrapping Up

This is a technology on the launching pad. Watch for Windows CE support to take off, leading to new software and peripherals that'll finally justify the fledgling OS. And models such as the Zaurus will fall under the one-two assault of Windows CE and Pilot.

But what about today? Right now, we'd recommend two machines over all the others, depending on how you work and what you want in a handheld—and neither is a Windows CE box. For the best software in a handheld that really feels like a computer, the Psion Series 3c is the clear winner. It's a great machine, well-supported by third-party publishers, and nibbles batteries.

If you're looking for something to hold you through the long periods you're away from the desktop, go for the Pilot. It's an innovator and a sure winner.

What about Windows CE? Our advice is to wait. There are really no compelling CE apps so far, and those that ship with the new OS aren't good enough to warrant spending $500 to $600. That'll change, though. Because as sure as Bill Gates can afford a Miata, Windows CE is going to be snapped up by every software publisher and hardware company going. In the next six months, there'll be better boxes, more ambitious applications, and some killer reasons to jump on the CE bandwagon. ▯

the boot 12-step program

DEALING WITH YOUR
PC **OBSESSION**
DAY TO DAY
BY BREAKING IT DOWN
INTO 12 **EASY** STEPS

this month:

Dare to Become a Usenet Voyeur

You like to use, don't you? You've heard the whispered rumors of treasures more valuable than gold and more satisfying than a pint of imported French-vanilla ice cream hidden deep within the dank recesses of the Internet. Scads of applications, tons of free fonts, photos of scantily clad men and women, and more raw data than a newspaper recycling bin all tempt you to plumb the depths of Usenet newsgroups. *boot* will now hand you the keys to unlock the Usenet door to a wondrous and ever-changing realm of sights, sounds, and a whole lotta binaries. Jack in and leave your inhibitions at the door!

— *Andrew Sanchez*

1 More Users Than a Betty Ford Clinic

Think of Usenet as thousands of people gathered together to discuss the head-on collision between a truck containing every back issue of *Hustler* magazine and your local public library's bookmobile... or maybe not. It's an online knowledge-sharing medium in the structure of a haphazardly thrown together scrapbook. Besides all the useful information and query based answers you can dredge up from the various newsgroups, there's a hell of a lot of weird and interesting stuff in there.

2 Access Denied?

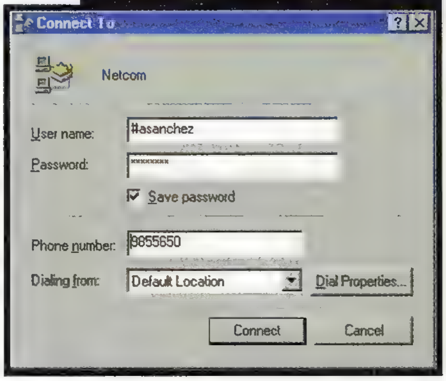
Check to make sure your Internet account has access to the Usenet newsgroups you're interested in—you'd be surprised at how many Internet providers restrict Usenet access. Some providers have decided (without your consent) which newsgroups they've deemed unsavory or lewd and will not allow you to surf the wide open expanses of Usenet space. Check your provider—if they're restricting your access, then chuck 'em and sign up with an unlimited access provider. If you're at work and your company doesn't allow access to the Usenet... well then, that's too bad, now, isn't it?

3 Choose Your Pleasure

If you're using Netscape Communicator or Microsoft's Internet Explorer, then you're already armed with a potent newsreader. With in-line decoding of GIF and JPEG files you can jump into the Usenet pool and get wet. But many of you will want a free-standing newsreader that's able to handle a multitude of encoding, knows how to save EXE and other binary files and generally has more features.

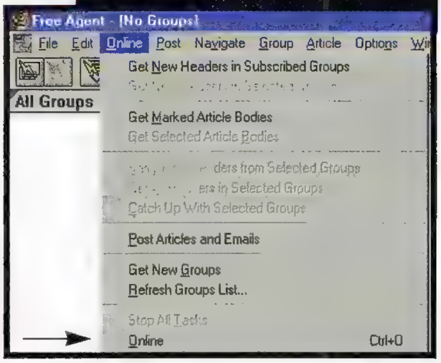
Among the arsenal of the Usenet savvy, Forté Inc.'s *Free Agent* is a robust newsreader that packs a ton of cool features. (Demos of the 16-bit and the 32-bit versions are on the *bootDisc*.)

③ Dial into the net by launching whatever program you use to log in. Once you're connected to the web, you're ready to rock.


Connect To
Netcom
Dial Properties...
Connect
Cancel

User name: #asanchez
Password: ********
☑ Save password
Phone number: 8855650
Dialing from: Default Location

⑤ Jack into the Usenet by selecting Online and the newsreader will go forth and retrieve.


Free Agent - [No Groups]
File
Edit
Online
Post
Navigate
Group
Article
Options
Wi
All Groups
Get New Headers in Subscribed Groups
Get Marked Article Bodies
Get Selected Article Bodies
ders from Selected Groups
ers in Selected Groups
Catch Up With Selected Groups
Post Articles and Emails
Get New Groups
Refresh Groups List...
Stop All Tasks
Online
Ctrl+O

4 Here Are Your Keys

After launching your newsreader, you'll need to tell it how your Internet account accesses Usenet. This involves ensuring that the NNTP field in the particular newsreader is pointing to your news server. Usually it will have the designation of:

nntp.*fill in with.your address*

Example: nntp.ix.netcom.com (for Netcom users).

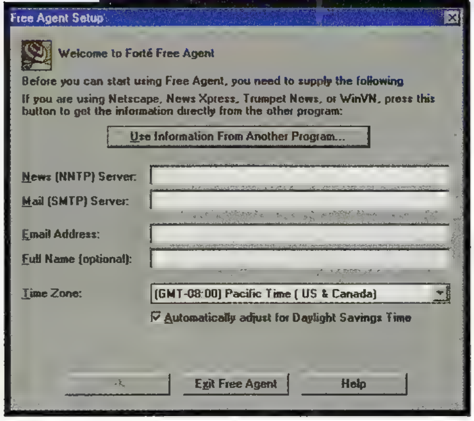
Also, if you plan to post messages to the Usenet, it's a good idea to put in your SMTP settings and your e-mail address. Fill in the appropriate fields with the correct settings.

Usually: `smtp.fill in with.your address`

Example: `smtp.ix.netcom.com` (for Netcom users).

Check with your Internet service provider (ISP) for your correct settings.

④ When *Free Agent* first starts up it will greet you with this screen. Get ready to unlock the doors to new and titillating sensations.

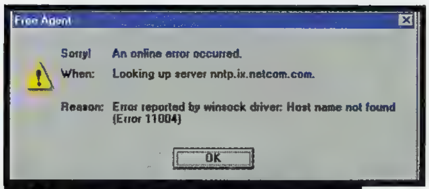

Free Agent Setup
Use Information From Another Program...
Exit Free Agent
Help

Welcome to Forté Free Agent

Before you can start using Free Agent, you need to supply the following

If you are using Netscape, News Xpress, Trumpet News, or WinVN, press this button to get the information directly from the other program:

News (NNTP) Server:
Mail (SMTP) Server:
Email Address:
Full Name (optional):
Time Zone: (GMT-08:00) Pacific Time (US & Canada)
☑ Automatically adjust for Daylight Savings Time

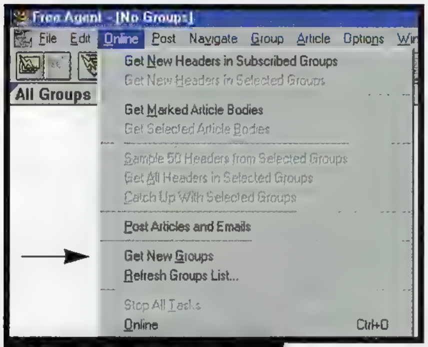


```
Sorry!   An online error occurred.
When:    Looking up server nntp.ix.netcom.com.
Reason:  Error reported by winsock driver: Host name not found
         (Error 11004)
```

⑤ Houston, we have a problem.

5 Is This Seat Taken?

Log onto Usenet by either typing CTRL O, or choosing the Online command from the Online menu. If you get an error message like the one shown above then one of two things is happening: either you entered the wrong data in step 4, or your Internet connection is experiencing so much traffic that it's not allowing you onboard. If you think you've entered the wrong data, it's best to check with your ISP to see what the correct settings are. Most good ISPs will have a FAQ section in the Customer Support/Trouble-shooting section of their web site.

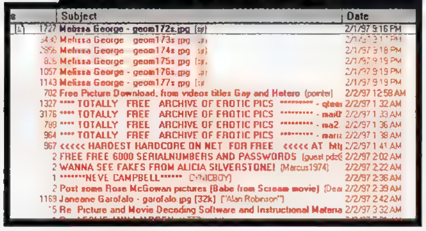

Free Agent - [No Groups]
File
Edit
Online
Post
Navigate
Group
Article
Options
Wi
All Groups
Get New Headers in Subscribed Groups
Get New Headers in Selected Groups
Get Marked Article Bodies
Get Selected Article Bodies
Sample 50 Headers from Selected Groups
Get All Headers in Selected Groups
Catch Up With Selected Groups
Post Articles and Emails
Get New Groups
Refresh Groups List...
Stop All Tasks
Online
Ctrl+O

⑥ From the Online menu, choose the Get New Groups.

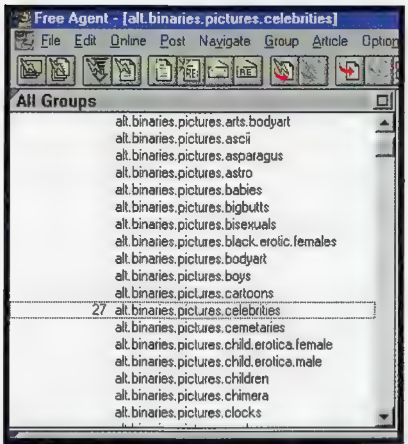
6 Faster Than a Speeding Slug

In order to enjoy the full splendor of the Usenet it's best to pinpoint where the action is found. It's time to check in on all the newsgroups. Since this is your first time, you'll want to see it all, then sort the chrysanthemums from the crap. Depending on your connection, this may take anywhere from 30 seconds to a whopping 10 minutes. Take this time to grab a snack, say "Hi" to your significant other, grab a drink, watch some TV... you get the drift. This is going to take a while, especially with a 28.8 modem.

Double clicking on any of these subjects will have *Free Agent* loading messages for your viewing pleasure in no time. ⑧



```
     Subject                                                              Date
1727 Melissa George - geom172s.jpg (sr)                                   2/1/97 9:16 PM
3440 Melissa George - geom173s.jpg (sr)                                   2/1/97 9:17 PM
2356 Melissa George - geom174s.jpg (sr)                                   2/1/97 9:18 PM
 826 Melissa George - geom175s.jpg (sr)                                   2/1/97 9:19 PM
1057 Melissa George - geom176s.jpg (sr)                                   2/1/97 9:19 PM
1143 Melissa George - geom177s.jpg (sr)                                   2/1/97 9:19 PM
 702 Free Picture Download. from videos titles Gay and Hetero (porter)    2/2/97 12:58 AM
1327 **** TOTALLY  FREE  ARCHIVE OF EROTIC PICS ********* - qlean         2/2/97 1:32 AM
3176 **** TOTALLY  FREE  ARCHIVE OF EROTIC PICS ********* - mai0          2/2/97 1:33 AM
 789 **** TOTALLY  FREE  ARCHIVE OF EROTIC PICS ********* - ma2.          2/2/97 1:36 AM
 964 **** TOTALLY  FREE  ARCHIVE OF EROTIC PICS ********* - mariz         2/2/97 1:38 AM
 967 <<<<< HARDEST HARDCORE ON NET  FOR FREE  <<<<< AT  htt               2/2/97 1:41 AM
   2 FREE FREE 6000 SERIALNUMBERS AND PASSWORDS (guest pdz@               2/2/97 2:02 AM
   2 WANNA SEE FAKES FROM ALICIA SILVERSTONE! (Marcus1974)                2/2/97 2:22 AM
   1 *******NEVE CAMPBELL****** (CYNICBOY)                                2/2/97 2:36 AM
   2 Post some Rose McGowan pictures (Babe from Scream movie) (Dea        2/2/97 2:39 AM
1169 Janeane Garofalo - garofalo.jpg [32k] ("Alan Robinson")              2/2/97 2:42 AM
  15 Re: Picture and Movie Decoding Software and Instructional Materia    2/2/97 3:32 AM
```



```
   alt.binaries.pictures.arts.bodyart
   alt.binaries.pictures.ascii
   alt.binaries.pictures.asparagus
   alt.binaries.pictures.astro
   alt.binaries.pictures.babies
   alt.binaries.pictures.bigbutts
   alt.binaries.pictures.bisexuals
   alt.binaries.pictures.black.erotic.females
   alt.binaries.pictures.bodyart
   alt.binaries.pictures.boys
   alt.binaries.pictures.cartoons
27 alt.binaries.pictures.celebrities
   alt.binaries.pictures.cemetaries
   alt.binaries.pictures.child.erotica.female
   alt.binaries.pictures.child.erotica.male
   alt.binaries.pictures.children
   alt.binaries.pictures.chimera
   alt.binaries.pictures.clocks
```

⑦ Double click on the newsgroup and you'll be greeted by this little box.

7 Choose Your Pleasure, Part Deux

If you see this listing, then you're in like Flynn. Now, it's time to go cruising for some action! Scroll up and down the listing and look for subjects that wet your whistle. Hmmm... if we were Teri Hatcher, we'd hide out with the rest of the celebrities. What's happening in **alt.binaries.pictures.celebrities**?

If you want to get a small sampling of what a newsgroup offers, then choose: Sample 50 Article Headers. Otherwise, either subscribe to it or choose: Get All Article Headers. Depending on the size of the newsgroup, this may take a while.

8 Time to Take a Peek

It's now time to see what people are saying and posting in your current Usenet group. *Free Agent* uses colors to designate the current status of the posted messages. Red means that they're new, black means you've been there. Since this is your first time in, everything will be red.

9 Yeow! What is This Mess?

If opening a posted message gives you a bunch of garbled text, you're looking at a binary file. It could be a picture, an EXE file, or even a TrueType font. How do you convert this garbage into something useful? Just right click anywhere on the body of the garbled text and a floating bar filled with choices will appear. Choose the Save Binary Attachment option to get a decode the binary attachment. After choosing your appropriate directory, click on OK.

If you come across a multi-part binary attachment—usually indicated by the same file name, but with 1/20, 2/20, etc. following them, Free Agent can splice together the mess when you decide to decode the first file. Free Agent will save the binary file in the subdirectory where it's installed.

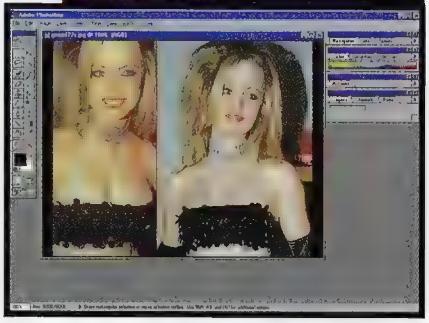
10 Peekaboo! I See You!

If you want to launch this application (see a GIF or run a program), simply double click on the file name in the lower work space or just press ENTER.

WARNING: Do not run any unknown executable program without running some type of anti-virus software first. This is one sure way of letting in the cooties! If your computer starts to itch or it starts to hurt when you go pee, don't say we didn't warn you. Got that?

For our example, we have Adobe *Photoshop 4.0* installed on our system, so *Free Agent* automatically launches that application, since it is associated with opening these types of files. If you have *Paintshop Pro* or any other art program, that will work as well. If you haven't designated one, you'll want to do so in order to make life easier for yourself.

Hitting Enter will launch your associated application once it has been properly decoded and saved. ⑩



11 Deciding Who's in the Mile High Club

If you find a newsgroup that's so cool that you know you'll be coming back to it time and time again, you can subscribe to it by just single clicking over the newsgroup's name in the upper left work window and hitting CTRL S or choose Subscribe under the Group menu.

12 Must Have Took a Wrong Turn

Where to go next? Well, you can either cruise the other newsgroups or even post to them if you like (all good newsreaders have the ability to post messages on the Usenet). If you decide to post your own binary file, make sure you try to keep it in one piece (usually by setting your options within your newsreader). Nothing's worse than downloading multiple files and pasting them together offline with some type of decoder (such as *CoderPad*). Having a newsreader that handles multi-part binary files always helps.

boot clinic

No spreadsheet but that calculator rips

I just read "Heat Kills and Speed Thrills" (Fast Forward, *boot* 06) and I can't wait for the new chips it outlined. I know they're RISC-based chips only running NT, but can they run a program that's designed to run under both Win95 and NT? Are there translation programs that could be used to make the chip run Win95 (with a drop in performance, of course)?

Lizard King

***Technical Editor Chris Dunphy replies:** NT runs on different CPUs, but Win95 is intimately tied to the Intel x86 architecture and won't run natively on anything else. Even though a DEC Alpha workstation may run NT it cannot run generic x86 NT software. To run on a given processor, software needs to be specifically compiled for it. You would need to buy software labeled "For NT on an Alpha." Not surprisingly, only a few such titles have been released.*

> "Is there a way to force programs into more physical memory and less swap file?"

Some work has been done on creating x86 emulators that run on the Alpha and other RISC chips. These create a virtual Intel CPU that runs some DOS and Windows programs—with a huge hit to performance. Don't get me wrong, you can have a great time mucking about with non-Intel based hardware. Just don't expect to be able to run Diablo, Excel, *or* Quake *anytime soon.*

To swap or not to swap...

After reading the "Tighten, Trim, and Tuck Your PC into Fighting Shape" feature *(boot* 06), I'm a little confused about the difference between swap file vs. file cache. What should the settings be for my system (primarily a gaming machine)? Is there a way to force programs into using more physical memory and less swap file?

Jym Schwed

***News Editor Bryan Del Rizzo replies:** Think of a swap file as virtual memory that's fooling the system into thinking hard drive space is actually system memory. File cache, on the other hand, acts as a virtual hard drive and uses a chunk of system memory to store files, reducing the need to access the hard drive.*

There's no way to force a game to use more physical memory and less swap file unless the game includes this as an option, or you install more memory. Try upping your 40MB to 64MB. Some games WILL take advantage of the full 64MB, by the way.

Means More eXpensive

I want to buy a P166 MMX chip but I'm not sure if my motherboard is compatible. The manual says to open one of the jumpers in order to switch to a P55C. Does this mean I'm MMX ready? I'm not sure my BIOS (dated June '95) will support the new chip.

Kevin Barnes

***Associate Disc Editor Sean Cleveland replies:** You're MMX ready. To accommodate the new CPU you'll want to re-jumper the board, changing the voltage to 2.5. Don't forget to change any other necessary jumpers as well.*

As for the BIOS, we're finding that it's best to upgrade to your motherboard's latest and greatest. If the manufacturer doesn't have a flash upgrade available, you may have to go someplace else. A good place to start is MrBIOS, www.mrbios.com *and then Unicore, software* www.unicore.com.

A baud situation

I have a 28.8 modem. When I download from the web, my top speed is about 3.6k per second (on a good day) and more often averages out to around 2.7-3.1k per second. What happened to the other 25k? I can understand loosing some throughput to line degradation and so on, but 25k worth? Don't I have a 28,800 baud modem? Am I misunderstanding the nomenclature? Please tell me what I'm misunderstanding about modem speeds.

Daniel-Day

***Technical Editor Chris Dunphy replies:** Networking and modem engineers measure how fast data moves in bits per second.*

Programmers and system builders measure speed in the number of characters, or bytes, transferred per second. No wonder you're confused!

The term "baud" adds further to the confusion. The baud rate indicates the number of signals being sent per second. In modern modems each signal carries several bits worth of encoded information. If your 28.8 modem sends 28.8k bits per second, which works out to be roughly 3k bytes per second, the baud rate may actually be closer to 2,400 signals per second.

How do you get a peak speed of 3.6k bytes per second if the modem can only do around 3k? The miracle of real-time data compression. Ain't technology cool?

Girlfriend problem continued

In reference to the letter in *boot* 06, about the guy trying to upgrade his girlfriend's hard drive. To make an exact duplicate, follow these steps:

1. Hook up your new drive as a slave (or secondary master).
2. Prep it by creating your partitions, formatting, etc. (do not use format /S).
3. Start up Win95.
4. Open DOS box.
5. Type xcopy /C /H /E /K C:\ D:\ and watch the files fly by.
6. Change to the D: drive and type attrib -R -A -S -H MSDOS.SYS
7. Type rename MSDOS.SYS TEMP.SYS, to make a backup.
8. From a c: prompt, type sys D:.
9. Switch to the D: drive, and rename your TEMP.SYS back to MSDOS.SYS.
10. Make a boot disk and copy the fdisk command to it.
11. Now make the new drive your primary master.
12. Boot to off a floppy, and run fdisk. Use option two to make the primary partition active and reboot.

If you did things correctly, you should have an exact duplicate of your original hard drive. The reason this method works is because a Win95 DOS box uses special capabilities of the xcopy32 command that aren't available at a DOS prompt. This takes care of the long file name problem. The flags attached to the xcopy statement make sure all files and their attributes, as well as subdirectories (empty or not) are copied to the new location. That's my 12-step program—I hope it helps!

Arthur Henry

In reply to the letter in *boot* 06 about Jay and his girlfriend's hard drive problem, I have very systematic method to do this:

Make a system disk from the current hard drive. Remove the source drive and attach the new one as primary IDE master. Place a primary partition on the drive, then format and transfer the system files to the new drive using the boot disk you just made. Replace the original drive as master and set up the new one as slave.

Boot the machine into Win95. Make a note of which drive letter is assigned to the new drive. Open Windows Explorer and make sure you don't have system files hidden (View, Options, check Show All Files). Make a Windows directory at the root of the target drive, and open it. Open the source drive's Windows directory in another Explorer window. Choose Edit, Select All, then scroll down to the file win386.swp and de-select it. Drag the selected contents to the Windows directory on target drive. Let it copy.

When the transfer is done open the root directory in both Explorer windows. Mark everything at the root of the source drive and de-select the Windows subdirectory and any win386.swp file that may be lurking at the root. Drag the selected contents to the root of the target drive. Let it copy over any existing files it finds, including system files.

Reattach the new drive as primary IDE master and power up. You'll start up your original Win95 intact every time if you follow this procedure. I learned this by recovering data from failing hard drives, and it's the fastest way I know.

Craig Henning

Pure DOS acceleration

I have a question regarding video cards. I use System Commander 3.0 with DOS 6.22

and Win95. I run all my games in DOS and my applications in Win95. I want really fast video in DOS for my games, and couldn't care less about Windows acceleration. Between the Hercules Dynamite 128 video and the Matrox Millennium, which one has faster video (fps) in DOS games such as *Quake* and *Duke*.

Paul

Technical Editor Chris Dunphy replies: *Both cards you mention are absolutely rockin' DOS performers, but I'd give the DOS gaming edge to the Tseng-6000 powered Hercules, and the Windows edge (particularly at higher resolutions) to the Millennium. Before you go off buying a new 2D-only card we suggest you consider your 3D options. Games won't remain stuck in DOS forever.*

Dysfunctional DirectX

I've noticed many of the newest games require DirectX. The problem is DirectX doesn't like my sound card. I'm running the factory card, a Packard Bell Sound Galaxy 14.4 combo, which obviously doubles as a modem.

Every time I install a game with DirectX onto my system, I lose sound capabilities, in everything but certain DOS games. Even uninstalling DirectX and reinstalling the old sound and video drivers doesn't work. All I can do is format and restore the system with the factory CD, since I didn't have my own backup!

BlacNyte

Reviews Editor Andrew Sanchez replies: *When installing DirectX make sure the version is compatible with your particular sound and video setup. Check with your vendor's web site for possible updated drivers that are DirectX compliant. Aggravating the problem is the less-than-elegant uninstall feature in Win95. If you repeatedly install and uninstall new device drivers you'll corrupt your registry files, and a corrupted registry file will wreak havoc on your system.*

To safeguard your system we recommend getting a utility program that keeps track of registry file modifications. Symantec's Norton Utilities 2.0 *for Win95 is one such creature. It has a killer registry editor and will even keep track of all your registry changes (even making backups of your old registry before modifications take place).*

Screamin' in NT

I just got a Screamin' 3D on your recommendation and it's awesome–in Win95, that is. The problem is, I dual boot between Win95 and NT 4.0 and no 4.0 drivers shipped with the card, but Rendition says the card supports it. Where can I find drivers for 4.0, or what drivers can I use as a substitute until they are released?

Technical Editor Chris Dunphy replies: *Jay Eisenlohr of Rendition feels your pain, he has an NT machine at home and is in the same boat as you. He says that they expect to have beta NT drivers available in early March '97, with final versions that will be distributed by Sierra (and the rest of the Vérité board makers) available a month after that.*

Makeshift motherboard manuals

Why don't motherboard manufacturers make good manuals? I'm trying to find information about the manufacturer of an Alton board called i430vx. Why do they never print addresses or phone numbers in the manual? This seems to be a common practice throughout the industry. Is a P55C board able to use the MMX CPUs? It has voltage jumpers down to 2.5 volts, however I don't see any way to have dual voltage for MMX. The manual mentions a dual voltage module and that the board is good for P54C and P55C CPUs, but I don't see how to do this with the current jumper setup.

Mark A. Paternoster

Reviews editor Andrew Sanchez replies: *Yes. P55C is the nomenclature for a Pentium CPU with MMX technology. While many of these smaller motherboard companies may give you a killer deal, you pay for it later when it comes to technical support. That's why we recommend staying with big-name manufacturers who've been in the business for a long time such as Intel, Tyan, ASUSTek, Micronics, AIR, and others.*

We tried looking for Alton on the web, but only came up with two references-none of them giving any information about the company. Let this be a warning to fellow boot *readers shopping for motherboards. If you can't find them on the web, don't give 'em your bread.*

Golem in the gears

I've been seriously considering a Cyrix 6X86 CPU but I'm concerned about software incompatibilities. How much of an issue is Pentium compatibility, NT write cache problems, and incompatibilities with 3D drivers; verses problems caused by BIOS, chipsets, or drivers? What issues will there be with the upcoming Cyrix M2?

Leonard Miyata

Technical Editor Chris Dunphy replies: *As CPUs become more complex they become increasingly hard to clone with 100 percent compatibility. The latest offerings from Cyrix and AMD are in some ways technically superior to comparable Intel chips, but they will always be haunted by some incompatibility issues. If you're cautious and do plenty of research first, to make sure the apps you plan to run won't have any problems, Pentium clones should serve you well.*

M2 looks nice on paper and we're very eager to see how well it performs compared to an MMX system. We'll be sure to let you know as soon as we know more.

The final frontier?

I loved the "Overclocking Your CPU" 12-Step article in *boot* 05. Is there any way to go beyond the maximum jumper settings for the motherboard? I have a P120 chip in a maxed-out P100 board. I hate losing those 20MHz but my jumpers won't go any higher.

Dan M. Sharrard

Associate Disc Editor Sean Cleveland replies: *There are ways to do this, but they're all extremely drastic. One of them has to do with physically replacing the clock crystal on your motherboard. You'd do far better replacing the motherboard entirely, though. Not only will you get better expandability, but newer components (such as the chipset) will give you even better performance.*

Is it worth the wait?

Should I wait for Klamath? I'm reading things everywhere about Win95 being the best for games and NT's true 32-bit environment being best for applications–I'm confused. I want the best of everything! I don't want to run NT if Win95 is better for games. If I have a Pentium Pro I don't want to run Win95 if NT is better suited for a Pentium Pro. So, is holding out for a Klamath worth it?

Mike Karmindro

Technical Editor Chris Dunphy replies: *It's going to be a while before Klamath is out and cheap enough for home use. Unless you're willing to wait until winter, the CPU I'd suggest you get would be a 200MHz MMX Pentium.*

As for the NT vs. Win95 question, do both. NT 4.0 is a great OS, but has spotty game support. Keep Win95 around for the games you run into that have problems under NT, and you'll be set.

CD-R huh?

My friend has a Mitsumi 8x IDE CD-ROM that can't read mastered CD-R media. Specifically, we're having problems with playing animations from a gold disc we've burned. Playback results in dropped frames and choppy sound. Copying the animation to the hard drive resulted in no more choppy sound or lost frames. We tried tweaking the Win95 cache but it only changes the dropped frame rate. The sound still sucks. My Toshiba 4x plays the same disc without error.

Dark Shadow

Disc Editor Sean Downey replies: *CD-R media's fundamentally different from commercial CD-ROMs. Instead of readable pits and grooves stamped into a metallic layer, CD-R media has the same info burned into a layer of organic dye. Many older drives have problems reading CD-R media. A good way to test this is to take a CD that works, copy it, and try reading both discs. This ensures that the problem isn't caused by the drive's lack of multisession support. Another thing to watch for is how the mastering session is closed.*

Send your 12-Step Clinic questions to the Doctor at:
clinic@bootnet.com

boot white paper

YOUR PERSONAL TECH BRIEFING ON THE CONCEPTS AND COMPONENTS THAT MAKE UP THE PC EXPERIENCE

this month:

Understanding MMX

The hype has been drilled directly into your brain by now—MMX-enhanced Pentiums will lead you to multimedia nirvana. Faster graphics, richer colors, better sound, improved 3D, huge performance increases, a washboard stomach, world peace... Intel has promised the sun and the moon to convince consumers that now is the time to buy a new chip. But what is it that makes the MMX so special? Where do these performance gains come from? Just what are these 57 new instructions doing and what makes them so well-suited for multimedia? Does the MMX live up to its hype? Is there a catch? Only *boot's* White Paper gives you the full scoop on MMX and what makes it tick.

As always, if you have any topics you would like to see dissected in a future issue, drop me a line. Cheers!

— Chris Dunphy
(cdunphy@bootnet.com)

If you are to believe Intel's Super Bowl ad blitz, MMX Pentiums get their multimedia power from dancing men in neon-colored sterile suits injecting "fun" directly into plain old Pentiums. Yeah, right.

Back in the real world, the improvements that the MMX chips have over the classic Pentium can be divided into two areas: general architectural improvements that up performance across the board five percent to 15 percent, and the 57 MMX assembly language instructions that allow for certain routines to run an order of magnitude faster.

ARCHITECTURAL CHANGES

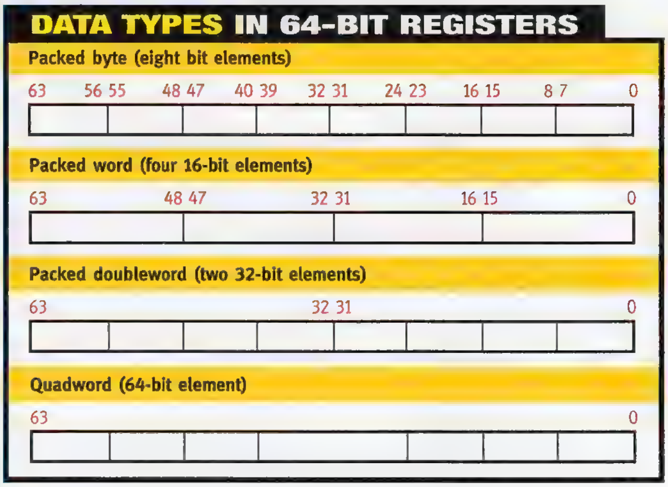
You can never have enough cache, and the most significant architectural change within the MMX Pentium is the doubling of the on-chip L1 cache from 16K to 32K. Other internal improvements include an improved branch prediction unit based upon the Pentium Pros, and better support for internal instruction execution parallelism. The lower 2.8V core voltage also allows MMX CPUs to be clocked faster without generating more heat (look for a 233MHz version soon).

NEW DATATYPES

MMX technology is based upon a computing technique known as SIMD "Single Instruction Stream, Multiple Data Stream" which allows for many separate pieces of data to be processed with a single instruction. This trick has traditionally been the sole domain of mainframes and supercomputers, but analysis of image and sound processing algorithms reveals tight repetitive loops that would benefit greatly from this technique.

To bring this technology to the masses, MMX Pentiums let their eight floating point registers serve double-duty as MMX registers. Each 64-bit register can be treated as an array of either eight individual bytes, four words, two doublewords, or as a single quadword. All of the values are treated as integers, avoiding the complexity of floating point math; and both signed and unsigned integers are supported.

DATA TYPES IN 64-BIT REGISTERS


Packed byte (eight bit elements)
63 56 55 48 47 40 39 32 31 24 23 16 15 8 7 0
Packed word (four 16-bit elements)
63 48 47 32 31 16 15 0
Packed doubleword (two 32-bit elements)
63 32 31 0
Quadword (64-bit element)
63 0

The MMX instructions perform operations on all of the elements within an array simultaneously, and under ideal circumstances two operations can be processed per clock cycle—allowing for 16 bytes to be processed in the time it would normally have taken to process one.

REALITY CHECK

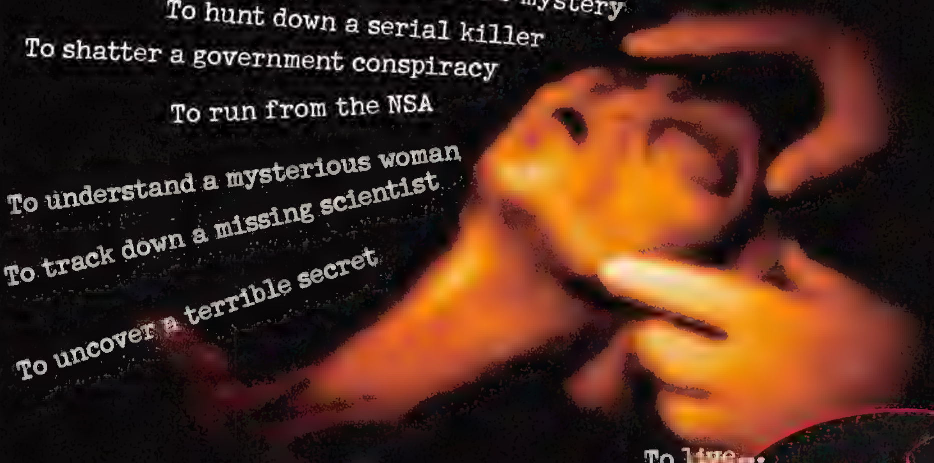
The MMX instruction set is a good Band-Aid on an aging architecture. It delivers dramatic improvements in performance for some key tasks, particularly image processing, signal analysis, and sound mixing. You would be a fool to buy a new PC that didn't support MMX if any of these tasks are important to you.

All future Intel CPUs will have MMX built in, starting with the P-Pro replacement, Klamath, due this summer. The coolest new software will be taking advantage of these features, and the Pentium classic and other non-MMX architectures will feel more and more obsolete.

But it is important to remember that MMX is not the Second Coming. It is just a much needed update to an assembly language instruction set that dates back to the '70s, and it exists just as much to pad Intel's pockets with upgrade money as it does to improve user performance. Intel is already planning their next set of upgrades to sell you—MMX2 is rumored to debut in their Katami processor sometime in 1998. It is reported to extend the SIMD concepts of MMX to single precision floating point numbers, necessary for accelerating 3D geometry calculations. Then at last in 1999 the aging Intel x86 architecture and instruction set will finally begin to be phased out as Intel introduces the 64-bit Merced chip.

Good luck charting the MMX waters. I hope you now better understand what you are getting into.

You Have Ten Days.



To unravel the Roswell UFO mystery

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To shatter a government conspiracy

To run from the NSA

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To track down a missing scientist

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Product Information Number 84

MMX INSTRUCTION SET The 57 new MMX instructions are the first significant enhancements to the Intel x86 instruction set since it was expanded to 32-bit support with the 386.

Category	Mnemonic	Number of Different Opcodes	Description
Arithmetic	PADD[B,W,D]	3	Add with wrap-around on [byte, word, doubleword]
	PADDS[B,W]	2	Add signed with saturation on [byte, word]
	PADDUS[B,W]	2	Add unsigned with saturation on [byte, word]
	PSUB[B,W,D]	3	Subtract with wrap-around on [byte, word, doubleword]
	PSUBS[B,W]	2	Subtract signed with saturation on [byte, word]
	PSUBUS[B,W]	2	Subtract unsigned with saturation on [byte, word]
	PMULHW	1	Packed multiply high on words
	PMULLW	1	Packed multiply low on words
	PMADDWD	1	Packed multiply on words and add resulting pairs
Comparison	PCMPEQ[B,W,D]	3	Packed compare for equality [byte, word,doubleword]
	PCMPGT[B,W,D]	3	Packed compare greater than [byte, word, doubleword]
Conversion	PACKUSWB	1	Pack words into bytes (unsigned with saturation)
	PACKSS[WB,DW]	2	Pack [words into bytes, doublewords into words] (signed with saturation)
	PUNPCKH [BW,WD,DQ]	3	Unpack (interleave) high-order [bytes, words, doublewords] from MMXTM register
	PUNPCKL [BW,WD,DQ]	3	Unpack (interleave) low-order [bytes, words, doublewords] from MMX register
Logical	PAND	1	Bitwise AND
	PANDN	1	Bitwise AND NOT
	POR	1	Bitwise OR
	PXOX	1	Bitwise XOR
Shift	PSLL[W,D,Q]	6	Packed shift left logical [word, doubleword, quadword] by amount specified in MMX register or by immediate value
	PSRL[W,D,Q]	6	Packed shift right logical [word, doubleword, quadword] by amount specified in MMX register or by immediate
Value	PSRA[W,D]	6	Packed shift right arithmetic [word, doubleword] by amount specified in MMX register or by immediate value
Data Transfer	MOV[D,Q]	4	Move [doubleword, quadword] to MMX register or from MMX register
FP & MMX State Mgmt	EMMS	1	Empty MMX s

They may not look like much, just simple arithmetic and comparison operators, but the key is that they operate on the different elements in an MMX register in parallel in one clock cycle.

There are two ways in which MMX instructions deal with overflow: wrap-around mode and saturation mode. Wrap-around can be demonstrated in base 10 by adding 7 to 6. If you were limited to one digit, you would wrap-around and the answer would be 3. Saturation, on the other hand, clips off values at their maximum. In this case, 7+6 would be 9. So would 7+5 and 7+7. Saturation mode is real handy for keeping a light pixel being processed by an image-lightening algorithm from overflowing and suddenly toggling to be dark. Not needing to check for and correct overflow lets MMX programs avoid a lot of error-checking code.

FLOATING POINT CONFLICTS?

To allow new MMX CPUs to remain backward compatible with existing software and operating systems, Intel overlaid the MMX registers and state on top of the existing floating point registers.

Since there are no new registers to worry about, the commands that the OS already uses to save and restore the floating point state when switching control between programs also work to save MMX register state. But of course, there is a price to be paid for this; individual programs can't easily switch between executing floating point and MMX instructions. A (relatively) huge time penalty occurs while the switch is made. Intel suggests that programmers try to keep floating point and MMX sections of code widely separated so that such mode switches will be kept to a minimum, and within Klamath they have reduced this performance hit somewhat.

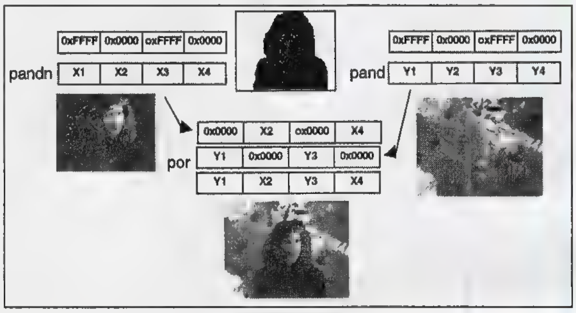
MMX APPLICATION EXAMPLES

One non-trivial example that shows the power of the SIMD techniques of MMX involves chroma keying an image on top of a background—similar to how a weatherman is overlayed onto his map.

With MMX technology, eight pixels can be processed at a time, and no branch instructions are necessary. Without MMX, every pixel must be processed separately and each involves a potential branch instruction.

Other real-world tasks that MMX instructions excel at include doing color shading and mixing, since a true-color pixel is made up of three bytes (four with an alpha channel), each byte of which can be easily manipulated and mixed with MMX commands.

MMX can also excel at audio processing, mixing 16-bit samples together to produce audio in software to rival most MIDI sound cards, without using up too much CPU time. Perhaps future computers will give up the expense of a sound card altogether, doing all the sound processing in software on the main CPU. On the downside, the MMX instruction set doesn't offer a 32-bit multiply, preventing the MMX instructions from being useful for very high-quality audio work.



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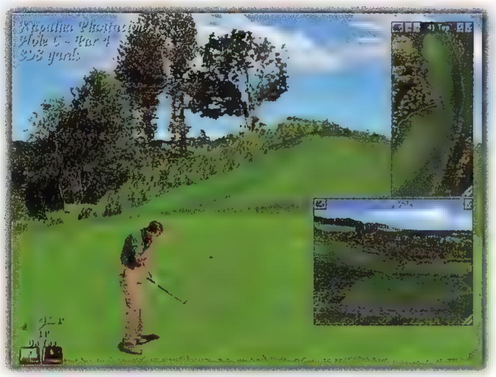
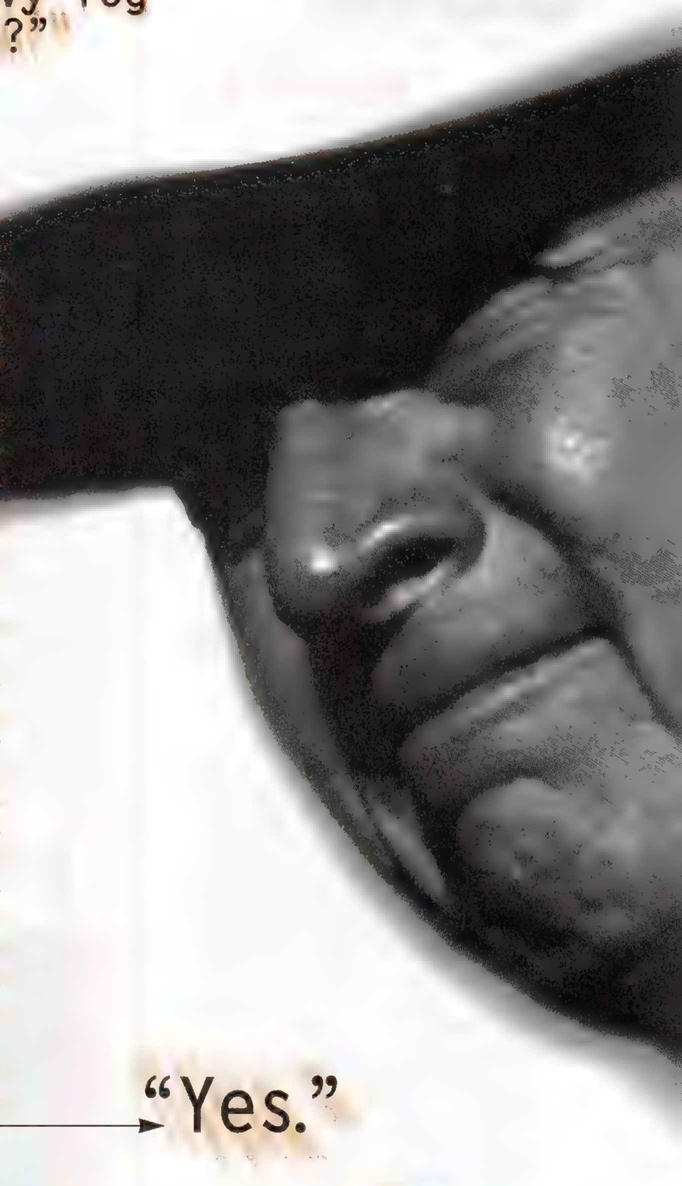


"Can I challenge Arnold Palmer
and my buddy in Tibet
to a skins game
on Maui
in heavy fog
at 3AM?"



Can I golf in 16.7 million colors? Can I play against Arnold Palmer at Latrobe? Can I play against my friend in Tibet? Can either of them beat me? Can I take a 3-D tour of the Kapalua Plantation Clubhouse? Can I play match play? Best ball? Skins? Can I add in my own sounds? Can I position a camera over the ocean? Can I place a camera right in front of the ball? Won't that break the camera lens? Can I still play all the Links Championship Courses? Can I add fog? Can I play with WIN 95? Can I get 1600X1200 resolution? Can I make a high-arching wedge shot back up on the green? Can I watch Arnie react to a good shot? A bad shot? Can I resize the viewing windows? Can I see the tees break off? Can I choose from different golfers? Both male and female? Can I use the mowing stripes to read the contour of the green? Can I take a Virtual Reality tour of Arnie's workshop? Can I golf in Hawaii, Pennsylvania and Chicago on the same day? Can I get a 3AM tee time? Can I hear the birds and waves in 3-D stereo? Can I hit my ball 1/2 mile out of bounds? Can I play from there? Can I watch aerial fly-bys of every hole? Can I choose from more than 17 add-on courses? Can I watch an instant replay of my swing? Are there multiple camera views? Can I challenge an artificially-intelligent computer opponent? Can I retract the control panel? Can I call toll-free for support? Can I take multimedia tours of Kapalua and Latrobe? Can I save a round in progress, go to dinner, and finish it later? Can I send and receive text messages during a round on the modem? If I lived on the course could I find my house? **Is Links LS the most realistic golf simulation ever?** ⟶ "Yes."

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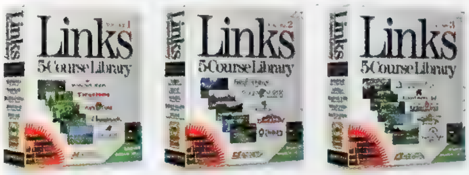

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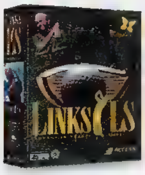

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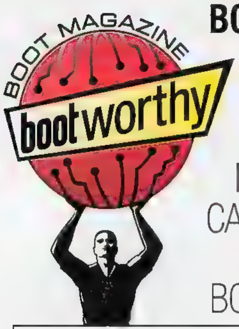
Product Information Number 80

boot worthy


BOOT MAGAZINE
bootworthy

EACH MONTH, **BOOT** EDITORS GATHER THE BEST **PRODUCTS** IN A SPECIFIC CATEGORY AND DEEM THEM: BOOT**WORTHY**

this month:

Motherboards

Looking to convert to the MMX religion but your current system still worships the pagan P54? Let *boot* guide you in the eternal quest for motherboard enlightenment. Absolutely nothing determines overall system performance more than your humble motherboard. Blessed is the motherboard, for based on your choice, your system will either sing the praises of MMX, Plug-n-Play, bus-mastered DMA, and USB support, or scream into the pits of eternal substandard damnation with non-upgradeable BIOS, hardware incompatibilities, and system crashes too horrid for words. And no fancy-shmancy 3D accelerator's gonna be able to save you. From the PCIset it utilizes, the amount of L2 cache it packs, the number of SIMM sockets it offers, to the flavor of BIOS guiding your entire system, a motherboard is your maker or breaker. Prepare to meet your maker. We spilled the beans on techniques for upgrading your motherboard back in *boot* 07's 12-Step Program—now, brace yourself for our favorites from the current crop of motherboards.

We preach the motherboard gospel because *you* demand it. Amen!

—Andrew Sanchez

ASUS P55T2P4/100A

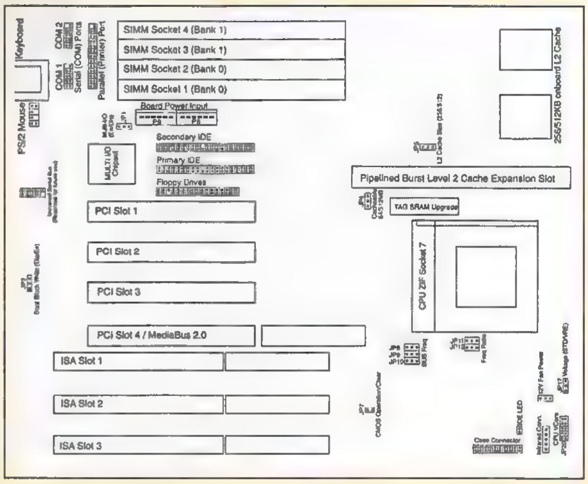
ASUSTek crashes through with their P55T2P4/100 MMX-ready motherboard. Complete with Intel's 430HX PCIset, this baby-AT formfactor board can handle up to 256MB of system memory—more than any VX-based motherboard, but doesn't push the 512MB limit. The entire Intel family of Pentium CPUs (including MMX), Cyrix's P66+ (Rev 2.7 or greater) as well as AMD-K5 CPUs will find a happy home on the P55T2P4/100.

With the P55T2P4/100, ASUS took a different approach to L2 cache, integrating the 512K pipeline burst mode L2 cache directly onto the motherboard bypassing the COAST module interface for possible upgrades.

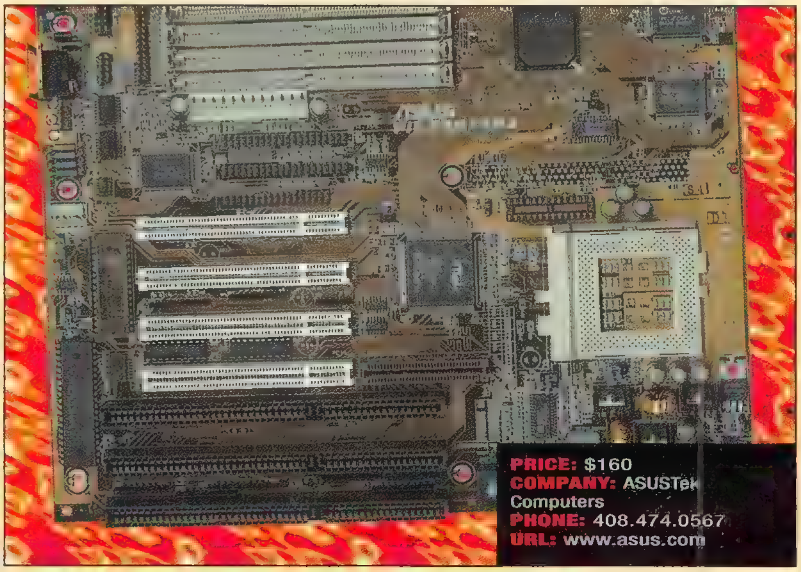
ASUSTek also provide a single, proprietary ASUS Media Bus. This additional slot, which sits aligned with the lowermost PCI slot, is intended for use with ASUSTek-specific products such as their ASUS I-A16C audio card. Most of you will probably wind up using the shared ISA/PCI slot as is, alongside the P55T2P4/100's three bus-mastered PCI slots and two ISA slots.

The motherboard's four 72-pin SIMM slots support Fast Page Mode or EDO DRAM, while power connection is handled by the 12-pin block connector, and IrDA header connectors usher you into the wireless age.

PCIset: Intel 430HX
Max Memory: 256MB
Number of Memory Sockets/Type: (Four) 72-pin SIMM
BIOS: Award
Cache/Max Cache: 512K/512K


Keyboard
PS/2 Mouse
COM 2
COM 1
Serial (COM) Ports
Parallel (Printer) Port
SIMM Socket 4 (Bank 1)
SIMM Socket 3 (Bank 1)
SIMM Socket 2 (Bank 0)
SIMM Socket 1 (Bank 0)
Board Power Input
P8
P9
Secondary IDE
Primary IDE
Floppy Drives
MULTI I/O Chipset
PCI Slot 1
PCI Slot 2
PCI Slot 3
PCI Slot 4 / MediaBus 2.0
ISA Slot 1
ISA Slot 2
ISA Slot 3
256/512KB onboard L2 Cache
L2 Cache Size
Pipelined Burst Level 2 Cache Expansion Slot
TAG SRAM Upgrade
CPU ZIF Socket 7
JP8
JP9
JP10
BUS Freq
JP11
JP12
Freq Ratio
JP7
CMOS Operation/Clear
12V Fan Power
JP17
Voltage (STD/VRE)
SMI LED
Case Connector
Infrared Conn.
CPU VCore

The ASUS Media Bus highlights this bad boy.



PRICE: $160
COMPANY: ASUSTek Computers
PHONE: 408.474.0567
URL: www.asus.com

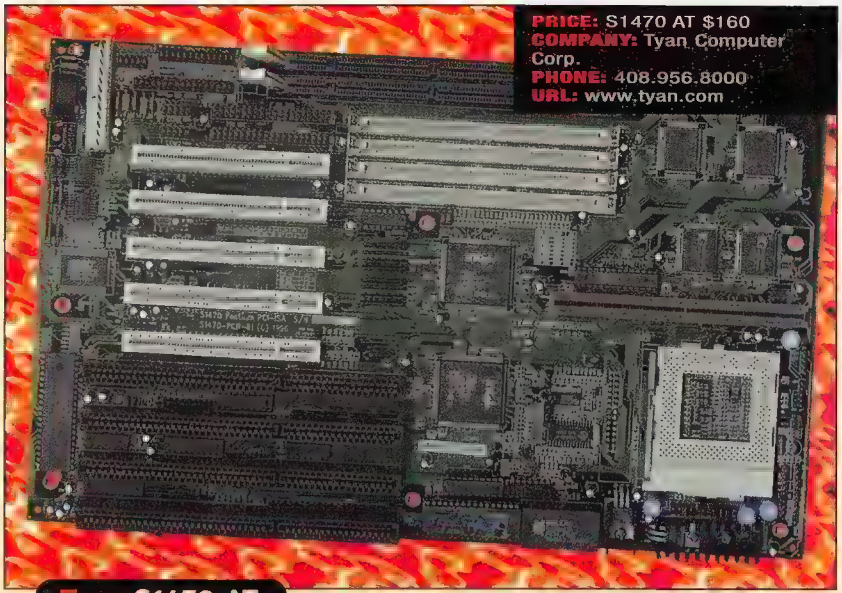
Tyan S1470 AT and Tyan S1472 ATX

Tyan unleashes PCI-slot mania with their S1470 AT formfactor and S1472 ATX form-factor motherboards. Incorporated by myriad computer manufacturers including Polywell, the S147x series is packed with wholesome upgrade goodness.

Tyan is the only bootWorthy motherboard that comes with a whopping four bus-mastered PCI slots, three ISA expansion slots, and one shared PCI/ISA combo (making for a grand total of five possible PCI slots). With Intel's 430VX PCIset you'll get the added bonus of being able to use up to two 168-pin DIMMs, but this bonus comes at the expense of the maximum RAM available to your system—128MB max. In contrast, the HX maxs out at 512MB of RAM, using conventional SIMMs. Both motherboards ship with the USB connector to prepare you for the imminent onslaught of USB-based products, as well as IrDA connectors for those who wish to add infrared-control capabilities to their system.

Curiously, only the S1472 has both styles of 5V power connectors (12-pin block and 20-pin Molex)—the S1470 only has the 12-pin block connector.

Both Tyans support Intel P75s through P200, MMX, and Cyrix's M1/6x86 processors, in addition to supporting all manner of memory, including EDO-DRAMs, fast-page mode DRAMs, and SDRAMs. Both motherboards integrate 256K of pipeline burst L2 SRAM cache directly on the motherboard, but you can boost it up to 512K via a 256K COAST module.

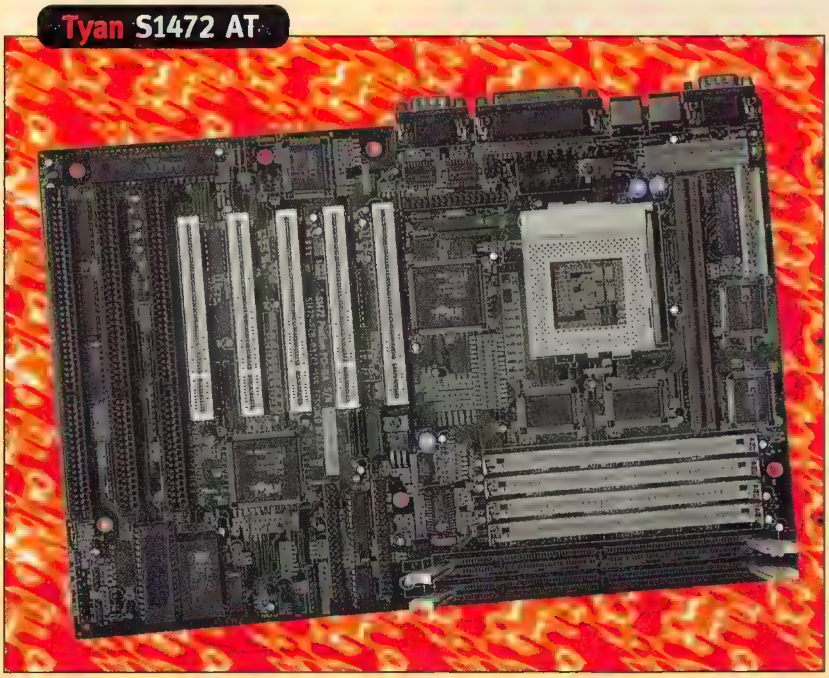


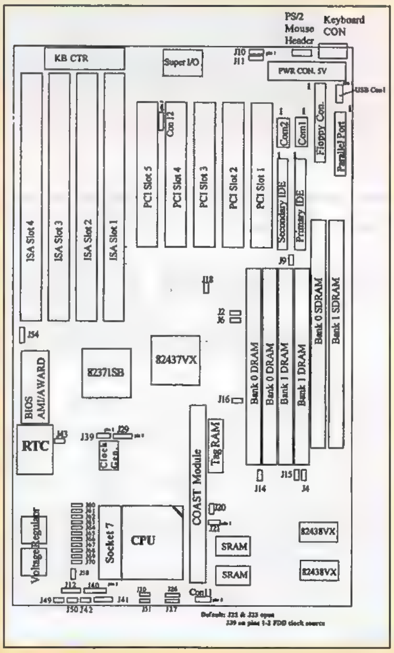
PRICE: S1470 AT $160
COMPANY: Tyan Computer Corp.
PHONE: 408.956.8000
URL: www.tyan.com

Tyan S1470 AT

PCIset: Intel 430VX
Max Memory: 128MB
Number of Memory Sockets/Type: (Four) 72-pin SIMM and (two) DIMM
BIOS: Award
Cache/Max Cache: 256K/512K

Tyan S1472 AT




PS/2 Mouse Header
Keyboard CON
KB CTR
Super I/O
J10
J11
PWR CON. 5V
USB Con1
ISA Slot 4
ISA Slot 3
ISA Slot 2
ISA Slot 1
PCI Slot 5
Con 12
PCI Slot 4
PCI Slot 3
PCI Slot 2
PCI Slot 1
Com2
Com1
Floppy Con.
Parallel Port
Secondary IDE
Primary IDE
J9
J18
J2
J6
J54
82437VX
82371SB
BIOS AMI/AWARD
J16
Bank 0 DRAM
Bank 0 DRAM
Bank 1 DRAM
Bank 1 DRAM
Bank 0 SDRAM
Bank 1 SDRAM
RTC
J43
J39
J29
Clock Gen.
COAST Module
Tag RAM
J14
J15
J4
Voltage Regulator
Socket 7
CPU
J20
J21
SRAM
SRAM
82438VX
82438VX
J12
J40
J49
J50
J42
J41
J31
J17
Con11
Default: J21 & J33 open
J39 on pins 1-2 FDD clock source

Do you have five PCI peripherals to fill Tyan's expansion slots? We can think of some—can you?

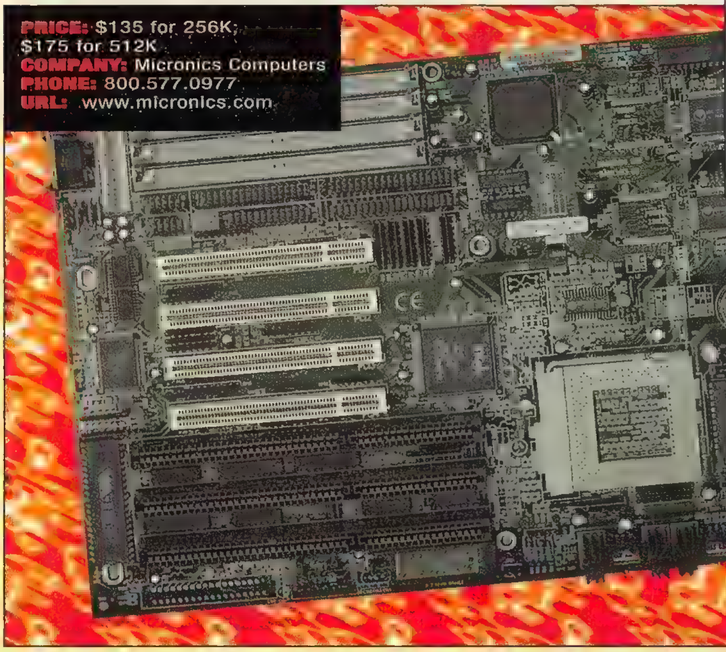
Micronics D5CUB AT

Micronics' D5CUB CPU's baby-AT formfactor motherboard comes armed with Intel's 430HX PCIset. While this means that they could have crammed up to 512MB of system RAM onboard, Micronics opted for a more conservative 256MB of EDO DRAM via four 72-pin SIMM sockets.

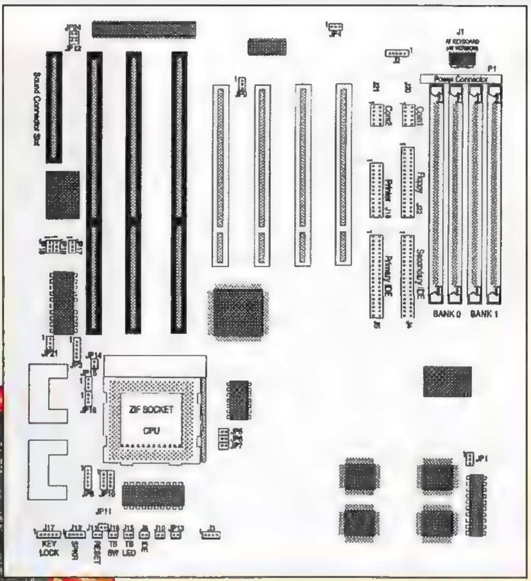
Intel's entire family (including MMX) and Cyrix 6x86 CPU can be installed in a snap thanks to the ZIF Socket 7 CPU holder.

You can choose from a D5CUB armed with 256K of integrated pipeline burst mode L2 SRAM or splurge for the 512K model. We recommend the larger cache, since the motherboard doesn't come with a COAST module interface for easy upgrades.

A total of seven expansion slots are available on the D5CUB, consisting of three bus-mastered PCI slots, two ISA slots, and one shared PCI/ISA slot.



PRICE: $135 for 256K;
$175 for 512K
COMPANY: Micronics Computers
PHONE: 800.577.0977
URL: www.micronics.com


ZIF SOCKET
CPU
BANK 0
BANK 1
Power Connector
KEY LOCK
Board Connector Slot
Primary IDE
Secondary IDE
Printer
Floppy
JP11
JP1

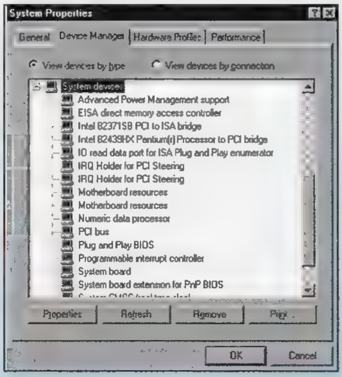
Choose your motherboard carefully... Micronics opts for the "soldered down" method of L2 cache.

PCIset: Intel 430HX
Max Memory: 256MB
Number of Memory Sockets/Type: (Four) 72-pin SIMM
BIOS: Award
Cache/Max Cache: 256K or 512K max

Tip: What PCIset You Playin'?

Picking your PCIset out of your system's line-up is as simple as:

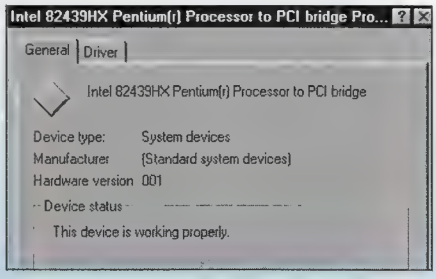
1. Under Win95, go to your Control Panel, go to Settings;
2. Double click on your System icon within the Control Panel;
3. Under System Properties, click on the Device Manager tab;
4. Double click on System Devices to expand the folder;


System Properties
General
Device Manager
Hardware Profiles
Performance
Properties
Refresh
Remove
Print...
OK
Cancel

● View devices by type ○ View devices by connection

System devices
Advanced Power Management support
EISA direct memory access controller
Intel 82371SB PCI to ISA bridge
Intel 82439HX Pentium(r) Processor to PCI bridge
IO read data port for ISA Plug and Play enumerator
IRQ Holder for PCI Steering
IRQ Holder for PCI Steering
Motherboard resources
Motherboard resources
Numeric data processor
PCI bus
Plug and Play BIOS
Programmable interrupt controller
System board
System board extension for PnP BIOS

5. Look closely and find a listing titled: *Intel xxxxxxxx Pentium Processor to PCI bridge*;


Intel 82439HX Pentium(r) Processor to PCI bridge Pro...
General
Driver

Intel 82439HX Pentium(r) Processor to PCI bridge

Device type: System devices
Manufacturer: (Standard system devices)
Hardware version: 001

Device status
This device is working properly.

6. The xxxxxxxx will be your chipset—examples of stuff you'll see include *82437VX* (430VX series) and *82439HX* (430HX series).

If it just says *Triton*, then you're armed with a 430FX PCIset. If it just says *PCI bridge*, then you have a non-Intel PCIset.

The PCIset Flavor Patrol

Get your H's and your V's straight

Are you confused about Intel's wacky PCIset nomenclature? Here's a quick rundown of the most current Intel PCIsets

430FX (Triton and Triton II)

This was Intel's workhorse of PCIsets for some time. For the most part superseded by the 430HX/VX PCIsets, but you'll still find the FX floating around older motherboards. When given the choice, go with the more recent releases.

- *Single Pentium CPU support.*
- *Maximum 128MB of RAM.*
- *Supports EDO DRAMs and pipeline burst SDRAMs.*
- *Bus Master IDE for quicker hard disk access and improved multimedia performance.*
- *Greater than 100MB/sec PCI data streaming.*
- *Integrated 16MB/sec bus-master IDE controller.*
- *Plug-n-Play compatible.*
- *USB support (Triton II).*

430HX

This PCIset, along with the 430VX, is this year's flavor, replacing the 430FX as the chipset of choice. Originally designed for the high-end power user and small business situations requiring lots of RAM. When choosing between the 430HX or 430VX, the main thing to remember is that the 430HX will support more system RAM, and support for dual Pentium CPU setup (if your motherboard's designed for it).

- *Dual Pentium CPU support.*
- *Up to 512MB system RAM.*
- *Backward compatible with the 430FX.*
- *USB support (up to two ports).*
- *Integrated memory address buffers, parity, and ECC support with standard parity.*
- *Fewer components than 430FX.*
- *Deeper write and read memory buffers.*
- *Integrated deep posting and FIFO buffers enable concurrent activity on both sides of the system controller for improved CPU utilization.*

430VX

Intel aimed the 430VX squarely at the home user, who Intel blissfully thought wouldn't need "so much RAM." Wrong!

The 430HX has been kicking some serious ass with its greater RAM support and faster overall performance.

The one thing that the 430VX has over its HX brother is the support of DIMM RAM chips. Depending on your RAM needs, the 430VX may be all you need for your applications.

- *Up to 128MB of system RAM.*
- *PCI 2.1 compliant.*
- *DIMM socket support for Fast Page, EDO, and SDRAM.*
- *USB support.*

430TX

The newest Intel PCIset has just landed and is making its rounds with motherboard manufacturers. ASUSTek and Microstar already have motherboards armed with the 430TX in the works.

While the verdict's not out yet on this new PCIset, rumors are circulating about how effective this new chipset is and what features it provides. Will it support ECC function or Ultra DMA/33 (a 33MB/sec hard drive protocol)?

Intel has tried to merge the best characteristics of the HX and the VX, and present them in the form of the TX.

While USB and DIMM slots are appreciated, early motherboards using the 430TX have maxed out at 256MB of system RAM—not exactly groundbreaking considering the HX can handle up to 512MB.

The biggest problem with the Intel PCIsets currently available is the 66MHz speed limit imposed on the memory bus. With faster Pentiums screaming into the 233MHz barrier and beyond on the horizon, the need for a faster bus becomes a necessity.

There are other non-Intel PCIsets from vendors such as VIA, UMC, SiS, and Acer's ALI all trying to out-engineer Intel and dance with the major motherboard manufacturers. Surprisingly, some of the non-Intel chipsets such as VIA's Apollo VP PCIset, support speeds of up to 75MHz—perfect for all you CPU overclockers out there!

AIR 54TPI

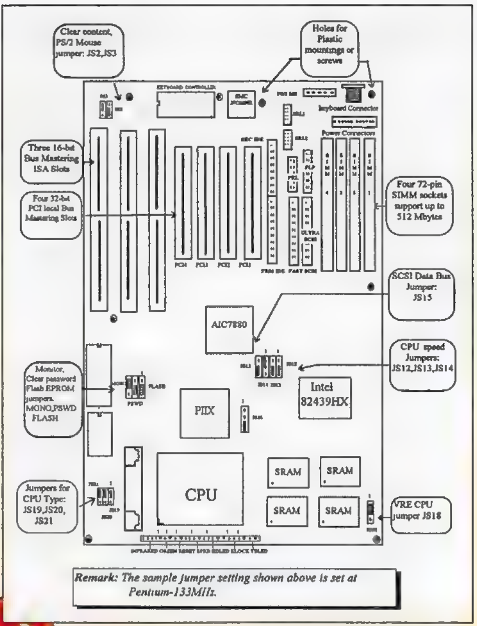
From Advanced Integration Research comes the MMX-ready AIR 54TPI system board. Thanks to the Intel 430HX PCIset, a massive 512MB of system RAM is possible. Like ASUSTek's motherboard, all Intel Pentium (including MMX), Cyrix, and AMD-K5 CPUs are granted access to this motherboard.

Three bus-mastered PCI slots, two ISA slots, and one shared PCI/ISA slot come standard on the 54TPI. Taking a nod from ASUSTek, the 54TPI integrates its 512K of L2 SRAM cache directly onto the motherboard, but it also looses the COAST module slot.

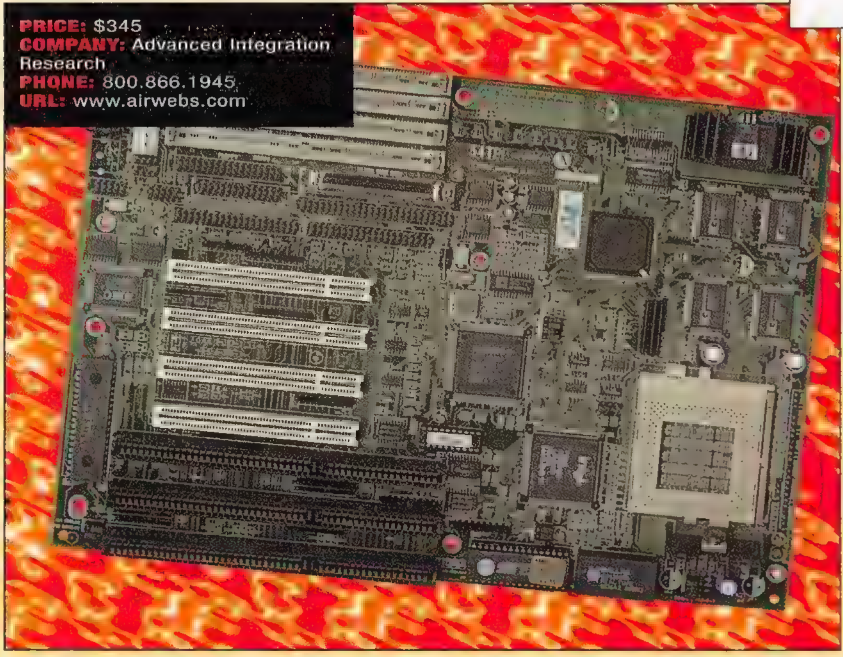
On top of the integrated EIDE controller that graces all modern motherboards, the 54TPI also comes strapped with an embedded Adaptec AIC-7880 bus-mastered SCSI controller with onboard BIOS. Complete with a 50-pin fast SCSI-2 and a 68-pin fast and wide SCSI-2 connector, you can connect up to seven devices on the 8-bit bus—maxing out at 15 devices on the 16-bit bus.

The accompanying Adaptec software will get your SCSI up-and-running in no time, complete with device drivers for almost all operating systems. Throw in the ability to boot from your SCSI device and you have the makings of a super-fast hard drive subsystem.

AMI's friendly point-and-click BIOS interface rounds out this robust offering.


Clear content, PS/2 Mouse jumper: JS2,JS3
Holes for Plastic mountings or screws
KEYBOARD CONTROLLER
Keyboard Connector
Power Connectors
Three 16-bit Bus Mastering ISA Slots
Four 32-bit PCI local Bus Mastering Slots
PCI4
PCI3
PCI2
PCI1
PRIM IDE
SEC IDE
FAST SCSI
ULTRA SCSI
FLP
SIMM 4
SIMM 3
SIMM 2
SIMM 1
Four 72-pin SIMM sockets support up to 512 Mbytes
SCSI Data Bus Jumper: JS15
AIC7880
CPU speed Jumpers: JS12,JS13,JS14
Intel 82439HX
Monitor, Clear password Flash EPROM jumpers. MONO,PSWD FLASH
PSWD
FLASH
PIIX
Jumpers for CPU Type: JS19,JS20, JS21
CPU
SRAM
SRAM
SRAM
SRAM
VRE CPU jumper JS18
INFRARED
RESET
Remark: The sample jumper setting shown above is set at Pentium-133MHz.

Go ahead—pack those SIMMs in there. 512MB should fulfill all your RAM-happy dreams.



PRICE: $345
COMPANY: Advanced Integration Research
PHONE: 800.866.1945
URL: www.airwebs.com

PCIset: Intel 430HX
Max memory: 512MB
Number of Memory Sockets/Type: (Four) 72-pin SIMM
BIOS: AMI
Cache/Max Cache: 512K/512K max

Where's Intel?

Many of you may ask why Intel's motherboards didn't make our bootWorthy party. After all, the maker of the world's most popular CPU surely must have the knack to crank out quality motherboards, shouldn't they?

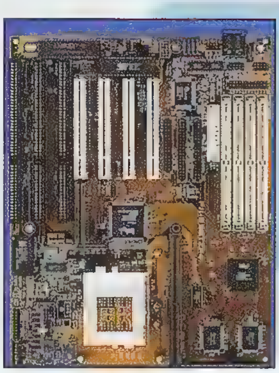
While Intel does make numerous motherboards, including the MMX-ready TC430HX ATX formfactor motherboard, when the invitation came, they couldn't supply the aforementioned board. A spokeswoman stated that their motherboards "aren't usually sold to end users and that they only sell to VARs interested in integrating the motherboards into their systems."

Despite this statement, we've seen Intel motherboards available to end users in the channels at retail outlets such as Fry's Electronics and countless mail-order catalogs (online and otherwise). You have to wonder if Intel really is unaware that their product is being sold to end users.

Oh well... maybe next time, Intel.

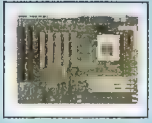
Formfactors

Different strokes for different folks



AT: The old standard. Variants include the Baby-AT formfactor. The biggest problem with AT is the positioning of the CPU, which sat in the way of full-length ISA cards, and the RAM sockets—which are often obstructed by system components and cables in a medium tower. Has been superseded by the ATX formfactor, but you'll still see ATs floating around in significant numbers from almost every motherboard manufacturer, so don't bury them just yet.

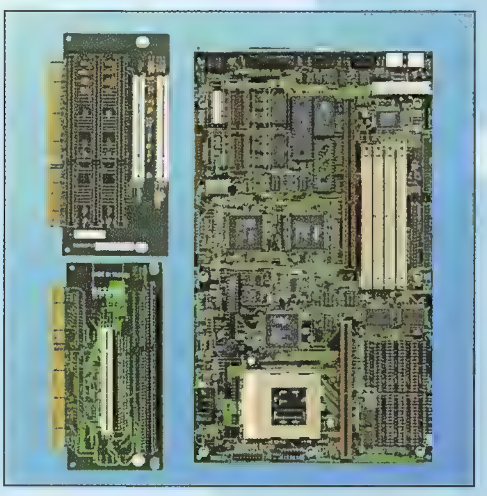
If you don't feel like forking over more ducats for a new power supply and case when upgrading, this is the formfactor for you.



ATX: The new standard. Apart from being smaller, the advantages of ATX include a tighter integration of I/O port components on the motherboard, which results in fewer cables running amuck inside your case.

The CPU and SIMM slots have been moved into a more accessible position for servicing. More importantly, the CPU is strategically placed for optimal cooling with the help of an ATX case's power-supply fan providing forced air circulation.

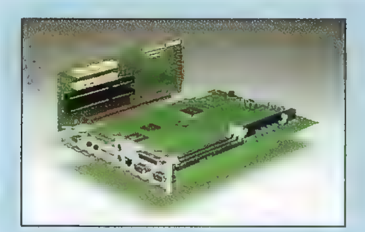
Every manufacturer will have an ATX formfactor motherboard in its inventory. If you're building a new system from scratch, this is the recommended formfactor. Just be sure you buy an ATX case to match.



LPX: A riser-board solution (single or double) for low-profile desktop situations. The LPX has also found its way into some tower cases (see the AST Advantage 9312 Communications review in *boot* 05).

Not the most elegant of designs, the LPX's only virtue is in its compact design. But, its non-standard power and case needs, and lack of popularity will have the LPX fighting tooth and nail to ward off the advances of the NLX formfactor.

Expect to continue seeing LPX for some time... at least, until NLX takes flight.



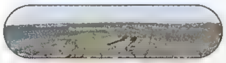
NLX: A new design recently unveiled by Intel meant to replace the ailing LPX for ultra-low-profile desktop cases. See this month's *Fast Forward* for the complete scoop.

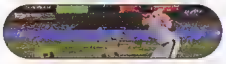
Already, ASUSTek has announced support for the new formfactor; and expect major computer manufacturers such as Gateway 2000, Hewlett-Packard, and NEC to use NLX in their new desktop systems.

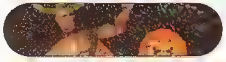
There are innumerable proprietary motherboard formfactors—Hewlett-Packard and Acer utilize variations of the riser-board design. If you're the proud owner of a proprietary system board, then the safe bet is to go talk to your system manufacturer for possible motherboard upgrades.

boot previews

HARDWARE ON THE HORIZON AND **SOFTWARE** SOON TO SHIP





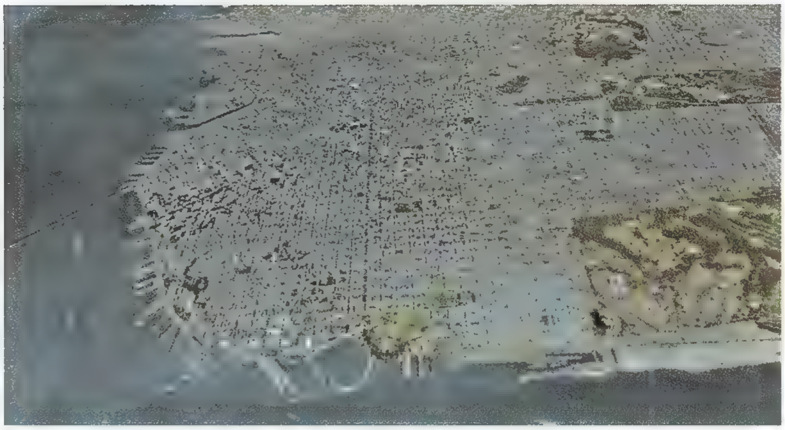


66 Flight **Unlimited II**
67 **The Dark** Project
68 iF-22 **Air Superiority** Fighter
70 Baseball **Roundup**
72 **Hexen** II
73 Montezuma's **Return**
74 **Net**Storm

The boot Tracking Sheet

TITLE	DEVELOPER	DATE
Armored Fist 2	NovaLogic	4/97
MDK	Shiny	4/97
Starfleet Academy	Interplay	4/97
Armored Fist 2	NovaLogic	4/97
Dungeon Keeper	Bullfrog	4/97
Jedi Knight: Dark Forces 2	LucasArts	4/97
Redneck Rampage	Interplay	4/97
Pro Pilot	Sierra	4/97
Red Baron II	Sierra	5/97
Rebellion	LucasArts	5/97
Hexen II	Raven	5/97
Fallout: A Post Nuclear Adventure	Interplay	5/97
Descent To Undermountain	Interplay	6/97
Windows 97/Memphis	Microsoft	6/97
Softimage v3.7	Microsoft	6/97
Quest For Glory: Dragonfire	Sierra	6/97
The Curse of Monkey Island	LucasArts	6/97
Flight Unlimited II	LookingGlass Technologies	6/97
Grand Prix Legends	Papyrus	6/97
Shadow Warrior	3D Realms	6/97
Unreal	Epic MegaGames	6/97
VR Baseball '97	Interplay	9/97
NetStorm	Activision	9/97
Crusader III	Origin	9/97
Dark Project	LookingGlass Technologies	12/97
Dark Vengeance	Reality Bytes	12/97
Mask Of Eternity	Sierra	12/97
10th Planet	Bethesda	12/97
Ultima IX	Origin	12/97
Prey	3D Realms	3/98
Indestructibles	Bullfrog	on hold
Creation	Bullfrog	on hold
Quake/Direct3D	id	DEAD
Bioforge II	Origin	DEAD

* These dates are subject to change



Take a trip above San Francisco's Bay Area with *Flight Unlimited II*'s incredible photorealistic landscape.

Flight **Unlimited** II

The hardware bully is back and flying high

A killer combo of photorealistic terrain textures and an intense physics-based flight model made the original Flight Unlimited *a PC flight sims benchmark. With a sequel taxiing on the programming runway awaiting take-off, we caught up with the folks at Looking Glass Technologies to find out what to expect from* Flight Unlimited II.

boot: What kind of enhancements can gamers expect from *Flight Unlimited II*?

Constantine Hantzopoulos, Project Director/Lead Designer: Well, first off, the terrain is huge—8,500 square miles to be exact—at the same resolution featured in *Flight I*. Each building taller than 10 stories and all major landmarks are done in 3D and are placed exactly where they belong. All rivers, roads, bridges, and lakes are clearly visible. For the first time ever on a PC flight simulator, you can do dead reckoning and VFR [Visual Flight Rules] navigation. It has to be seen to be believed. Weather, night flying, and time transitions—sunset, for instance—will also play a big factor in gameplay. We are developing the best flight modeling in the industry, so that a Cessna 172 really feels like a Cessna 172. What this means is a truly immersive "you are there" feeling. Heck, I can find my friend's house and the Home Depot he shops at!

boot: Will *Flight II* use an enhanced *Flight Unlimited* terrain rendering engine?

Jaemz Fleming, Lead Programmer: The nature of presenting terrain of infinite size and variety compared with the 5x7-mile repeating patch of terrain seen in *Flight I* required a new engine, though its creation was informed by our experience with the old one.

boot: How did you generate polygon terrain from the satellite photographs?

Fleming: Well, that would be telling, wouldn't it! But it's revolutionary in two ways. First, we process satellite data in a really sneaky way from multiple sources to get the highest possible resolution and color fidelity.

Second, our rendering engine uses polygons *way* more intelligently than before. In *Flight I*, we just scattered polygons around you like crazy. *Flight I* was an awesome looking game. But in *Flight I*, you got a lot of "popping." If you flew close to a mountain, the mountain seemed to jump up in your face as you approached and you found yourself crashing into it. In *Flight II* that will never happen. The outlines of the mountains, hills, and buildings stay rock solid as you get close to them, and yet be incredibly detailed.

We're also working on more realistic hazing algorithms for distance cueing. Traditional hazing algorithms look like the world is immersed in sky colored mist, and that's wrong. It's also worth noting that we use haze *only* for distance cueing, not to hide our lack of terrain.

boot: The original *Flight Unlimited*'s graphical intensity has a reputation for bringing the mightiest systems to their knees. Will *Flight II* be the same kind of bully? And what kind of hardware support will the game require?

S/W

Hantzopoulos: Yeah, *Flight II* will do that. But you have to look at the times as well. When *Flight I* shipped, the P90 was the high-end machine and it ran quite well in 640x480 on that system. Today, the base gaming machine is a P120. Currently, it looks like the frame rate will be about the same as *Flight I* for the same screen resolutions. So if you can run *Flight I* on your machine, you can run *Flight II*. And since *Flight II* is a Win95 product, we plan on supporting acceleration through Direct 3D. We also plan on supporting the 3Dfx and Rendition chipsets, as these are the best of the bunch. MMX will come later.

boot: How will *Flight II* ward off the advances of games such as Sierra's *Pro Pilot*?

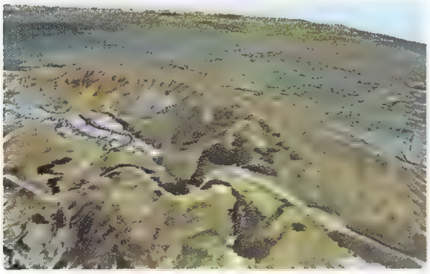
Hantzopoulos: *Pro Pilot* focuses on *generic* terrain textures draped across the entire United States at 30 meters per pixel. This means there's nothing really unique in their terrain. Ours is the real deal. We used four meters per pixel satellite imagery. Sure it's smaller, but it's unique in that you are actually flying over what it looks like in real life. To fly from one end of our area to the other will take you about an hour and a half—and believe me, there's so much to explore that you won't notice the size limitation at all. Plus, plugging in add-on terrain packs with new aircraft will be a no-brainer.

boot: Will there be NAV aids? What about interaction with ground control?

Hantzopoulos: *Flight II* will be fully IFR [Instrument Flight Rules] equipped. And, as for a fully interactive ground, tower, and approach controller... well, if I told you about it I'd have to kill you.

boot: Speaking of killing, will there finally be combat in *Flight Unlimited*?

Hantzopoulos: *Flight II*'s focus is on civilian aviation, not combat. We *are* planning on doing a combat game, right after *Flight II* ships. It's looking like it's going to be WW I or WW II. We're all prop plane fanatics, so jets are out.



In a year of awesome terrain generators, *Flight Unlimited II*'s environment will make anyone's mouth water.

product info

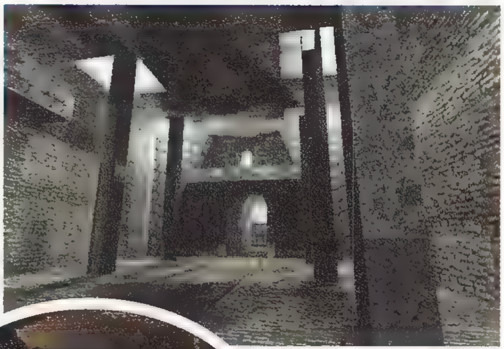
AVAILABLE: summer 97
PRICE: TBA
DEVELOPER: Looking Glass Technologies
PUBLISHER: Eidos
PHONE: 617.441.6333
URL: www.lglass.com

The **Dark** Project

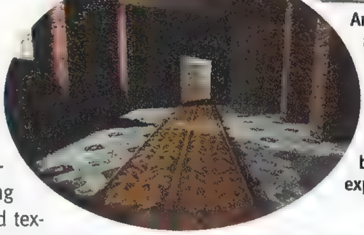
Heart of darkness

In The Dark Project, *magic runs rampant and evil threatens the very fabric of reality. Not the best way to start your day, but Looking Glass Technologies is hoping their next first-person perspective role-playing adventure will introduce a whole new reality.*

Project Leader ***Greg LoPiccolo*** *guides* boot *through the heart of* The Dark Project.



An immersive RPG experience awaits those who enter *The Dark Project*.



3D acceleration promises to push *The Dark Project* beyond anything previously experienced by any RPG player.

boot: What type of game is *The Dark Project*?

LoPiccolo: *The Dark Project* will transport players to a magical age via a next-generation engine combining lightning fast frame rates with advanced texture mapping to create a true "6D" world. Dynamic lighting and interactive water, a realistic weapons interface, mission-based gameplay, and an in-depth storyline all enhance the game experience.

The rendering engine is a volumetric renderer with ray-cast lighting, similar to those in development by all of our competitors. We think it looks terrific, but hey, 3D engines are pretty standard fare these days.

Our new object technology, which we call Act/React, allows us to easily and intuitively assign multiple properties to objects and non-player characters [NPCs] and have them behave correctly in the world. This allows us to simulate an incredibly rich and detailed world with far less coding gruntwork than would have been necessary in the past (although there's still enough gruntwork to go around) and to allow the player a wide range of interactions with the game world.

Simply put, you don't just shoot things until they fall over; most things actually work as you expect.

boot: Performance is always a concern with polygon-based games. How will *The Dark Project* work around these issues?

LoPiccolo: The hardware back end for the renderer is basically a separate pipeline, and will be hooked up to Direct3D and have other ways of talking to 3D boards. Also, *The Dark Project* will run at multiple resolutions (320X200 and 640X480 to start) and have other options to scale the game to different speed machines.

boot: The PC gaming community has recently been besieged with "RPGs for everyone" a.k.a. "watered-down RPGs." *The Dark Project* is billing itself as an RPG—how intense will the RPG experience be?

LoPiccolo: We're pursuing a different path than a lot of our competition. Rather than tons of stats and armies of NPCs, we want to present a rich, immersive experience. To wax dogmatic for a moment, it's our feeling that a lot of the trappings (stats, etc.) of traditional computer RPGs are essentially vestigial remains from their paper ancestors (Dungeons & Dragons and the like). In a proper RPG as we envision it, feedback to the player is expressed in the world itself, not as stats that you monitor. This is the approach we pursued aggressively in *System Shock* and which should take *The Dark Project* to a whole new level.

boot: Will players be able to wander around the countryside, or will they be stuck in dungeons and mazes?

LoPiccolo: We're not really pursuing "wandering around the countryside." Let's face it: A world where you can go anywhere and do anything isn't much fun if there's not much of anything to do. Our idea of fun (at least this year) is a constrained environment with lots of depth and detail, which allows players real power and flexibility in how they choose to interact with the world. Trust us—it will be very cool.

product info

AVAILABLE: fall 97
PRICE: TBA
DEVELOPER: Looking Glass Technologies
PUBLISHER: Eidos
PHONE: 617.441.6333
URL: www.lglass.com

S/W

iF-22 Air Superiority Fighter

When lightning strikes

Lockheed-Boeing's F-22 Lightning II *air superiority fighter has been vector-thrust into the realm of super-stardom, thanks to sims from EA/Jane's, NovaLogic, and Interplay. Do the unfriendly skies have room for another F-22 sim? Interactive Magic thinks so, and* iF-22 Air Superiority Fighter *is their high-tech ticket into the turn-and-burn world of modern aerial combat.*

Doug Kubel, VP of Technology, tells boot *how iF-22 will push the flight-sim envelope.*

boot: How will *iF-22 Air Superiority Fighter* differ from NovaLogic's *F-22 Lightning II*?

Kubel: *iF-22 Air Superiority Fighter* is targeted at players who want the most realistic F-22 flight experience possible, coupled with a very deep campaign and mission generation system.

iF-22's out-the-cockpit view is of actual terrain, not an artist's rendering—when you fly over Bosnia at 20,000 feet, it looks like Bosnia *really* looks at 20,000 feet. You can actually navigate with real-world navigation maps, and terrain features are right where they should be, because *iF-22*'s terrain database is built from satellite photo textures and real-world elevation data. Add in a high-fidelity flight model, realistic weapon and sensor performance, stealth modeling, state-of-the-art avionics and cockpit models, enemy aircraft that will use all the air combat maneuvers in the book, and you have the most authentic simulation of the F-22 to date.

And we haven't forgotten the folks who just want to jump in the cockpit and blast some bad guys, so you'll be able to turn down the realism knobs if you want and have a game that's a good bit easier to fly and have fun with while you're learning.

iF-22 also has a sophisticated dynamic mission generator and campaign system, so every time you play you're faced with the unexpected, just like the real thing. Dynamic mission generation means that your mission brief is selected from a list of various types, such as Combat Air Patrol or SEAD (Suppress Enemy Air Defenses). Each brief is constructed by the system based on the current targets and threats in your virtual world before you take off, and while you're flying, your forces are actually doing battle with the enemy forces.

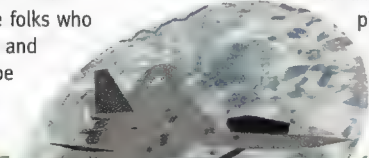
At the end of your mission, your world has changed, so when you fly the next mission, SAMs and tanks and other mobile objects will have moved. In addition, objects that you destroyed in the last mission stay destroyed until the enemy has had enough time to repair or replace them. It's a new experience each time—you've got to stay sharp!

boot: The terrain generator of *iF22* looks pretty incredible. Explain how your texture-mapping polygon engine differs from others out there.

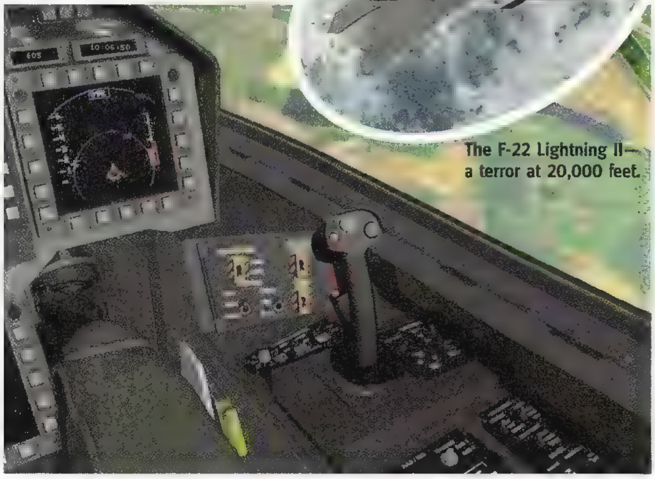
Kubel: Our *DEMON-1* engine is highly optimized for rendering real-world terrain at the normal operating altitudes of the F-22. It supports multiple levels of detail to optimize the rendering speed vs. image quality. In addition, we have a terrain management system in place that deals with the complexities of getting just what's needed from the 400MB of texture and elevation data that describe each theater of operation. The engine also runs well on Microsoft's Direct3D, so we take advantage of the great 3D accelerator hardware that's available these days.

boot: What graphic resolution will *iF-22* crank out? At what color depths?

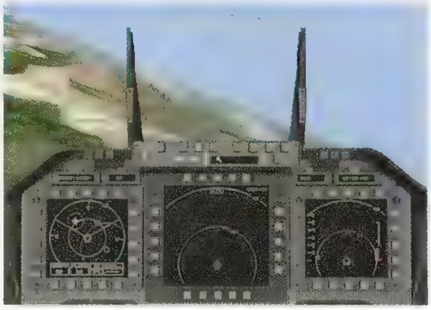
Kubel: *iF-22* supports 640x480, 800x600, and 1024x768. With a 3D hardware accelerator, we use 16-bit color depth; with the software renderer, we use 8-bit.



The F-22 Lightning II—a terror at 20,000 feet.



Why fiddle with keyboard commands, when you can press buttons in *iF-22 Air Superiority Fighter*'s Active Cockpit to perform those actions?



iF22's *DEMON-1* terrain generator engine will pack some serious texture-mapped polygon-pushing power.

boot: Will all the graphics be based on polygons, or will 2D sprites sneak in?

Kubel: We use animated 2D bitmaps for explosions, chaff, flares, etc. These, combined with true 3D debris models, give us great looking explosions. We also have a very cool 2 1/2D sort of way of creating missile smoke trails and battlefield smoke.

boot: How big will the landscapes be?

Kubel: Each terrain area is approximately 80,000 square miles—that's about a quarter million square miles of terrain for the whole game! And since it's from satellite imagery, not tiled, it doesn't repeat like the terrain texture in some games.

boot: What kind of flight model can we expect from *iF-22*? Will it be skewed toward hardcore realism or be more arcade-like?

Kubel: There are multiple flight models. The arcade mode is for the inexperienced flyer—the flight controls are somewhat decoupled, and the behavior is very straightforward. For the realistic flight model at the other end of the spectrum, we modeled thrust vectoring, high angle-of-attack maneuvering, altitude effects, engine performance effects, control systems (we model the stability augmentation system, the rate control systems, etc.), stores effects on weight, balance, and moments (and drag, too, if the stores are external).

But wait, there's more...

boot: Will it support multiplayer gaming? How? Modem? Internet?

Kubel: *iF-22* will support multiplayer both head-to-head and cooperative missions via modem or LAN. We haven't decided about our plans for Internet support yet... stay tuned.

— *Andrew Sanchez*

product info

AVAILABLE: june 97
PRICE: TBA
DEVELOPER: Interactive Magic
PUBLISHER: Interactive Magic
PHONE: 919.461.0722
URL: www.imagicgames.com

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Play Ball!

The sims that'll make summer simmer

With spring training just around the corner, Electronic Arts, Virgin Interactive Entertainment, and Mindscape all have new baseball games stepping up to the plate.

We spoke to ***Chuck Osieja****, producer of Electronic Arts'* Triple Play 98*;* ***Jesse Taylor****, producer of Virgin Interactive Entertainment's* Grand Slam*; and* ***Justin Kubiak****, Associate Producer of Mindscape's* Aaron vs. Ruth *to see what's in store for the upcoming season.*

boot: There's stiff competition. How will your game be different from the other players?

EA Sports: As a baseball fan I've always been disappointed with baseball games because they were so infatuated with having every statistic under the sun but ignored the most important part of the game: the on-field gameplay.

We wanted *Triple Play 98* to be a PC product with console playability, a game that feels and reacts like baseball games should, and then *add* the statistics and depth that PC gamers expect.

VIE: *Grand Slam* has new mechanics not seen in other baseball games. One is a Batting Meter that adjusts the power vs. accuracy in each swing. The other is a Pitching Meter that varies the speed of pitches and adds a twitch mechanism that affects the accuracy of pitches.

Grand Slam also features superb AI and plays a very realistic game of baseball. Our baseball stadiums are extremely accurate, and the fields are exact in dimensions to the real stadiums they represent.

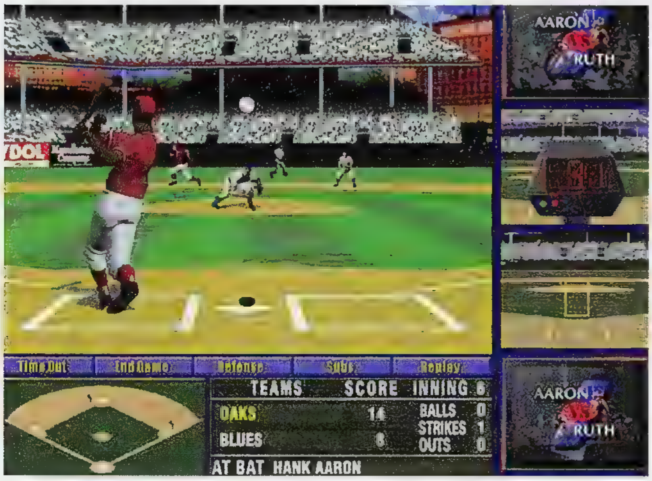
Mindscape: Instead of entering the cannibalistic sports market with another "me too" baseball sim, *Aaron vs. Ruth* focuses more on great players and great gameplay.

Some of the unique features include: a pitch location window that reveals the exact location of every pitch; unique player movements; old-time stadiums—including Ebbets Field, The Polo Grounds, and Crosley Field; and web-linked player bios.

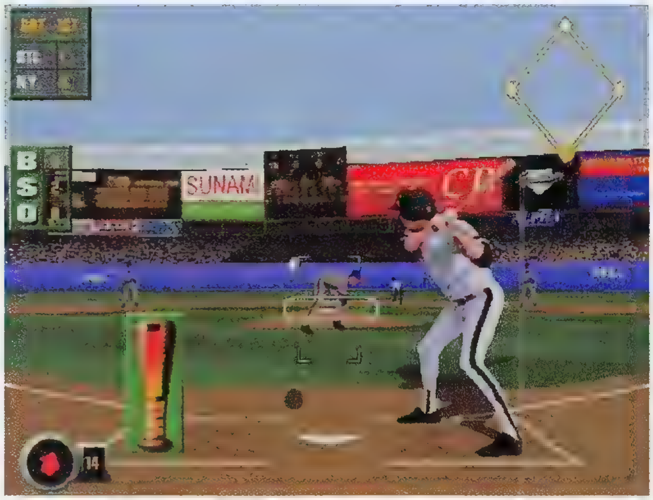
boot: How will you satisfy both the hardcore stat fans and the arcade fans?

EA Sports: *TP 98* tracks and displays stats in more than 50 categories. We were careful to make sure the stats consisted of categories that will be useful in helping the player formulate strategy, not just stats for the sake of stats.

VIE: *Grand Slam* tracks full stats for 868 players and their prospects over the entire season. For action fans, the new mechanics offer unprecedented control. *Grand Slam* can be configured to play a statistically-oriented game or a twitch game.



Aaron vs. Ruth **will feature the classic players, and their classic moves—such as Pete Rose's head-first slides, and Joe Morgan's chicken-wing elbow snap.**



Grand Slam **will include all of the Major League players, but unfortunately, not the MLB team logos.**

Mindscape: In addition to the career stats and player bios, stats fans will find all the features they've become accustomed to. Arcade fans will love the playability, based on the new and traditional gameplay features as well as its ease of use. The stats fans can also link to our *A vs. R* and Total Baseball sites for even more data.

boot: How extensively will stats be maintained and how frequently will individual stats be updated?

EA Sports: We'll be updating the leader board after each game. Players will be able to view the leader's on their team, in the American or National, or compared to the entire league. Entire teams will also be ranked so you can see how your team's batting average, home runs, etc. compare to other teams in the league.

VIE: Grand Slam gives updates after each game.

Mindscape: Individual game stats are not tracked. We wanted to stay away from too many stats and focus on gameplay. We do track the standings in Series and Season mode.

boot: What special techniques were used to capture player movements?

EA Sports: We spent six weeks capturing moves for the most extensive animations ever seen. This year's product will have "signature moves" for every player. *TP 98* also incorporates a proprietary "motion blending" technique that allows us to seamlessly move from one animation to another.

VIE: The players in *Grand Slam* are real baseball players who were video digitized because polygon players don't look life-like enough. We have four body styles of batters and four other body styles for pitchers, with different styles and stances. This makes our players look more realistic.

Mindscape: We used optical motion capture, as opposed to the magnetic, giving us the freedom to use as many different angles as needed. This translates into clean motions. We were lucky to find some college players who were particularly good at imitating swings.

Additionally, we edited and refined the motions frame by frame to make sure we got the look we wanted. I think the results speak for themselves. You'll see things like Juan Marichal's high leg kick, Pete Rose's head-first slides, Willie Mays' basket catches, and Joe Morgan's chicken-wing elbow snap.

boot: How are the game's graphics rendered?

EA Sports: *TP 98* uses a full 3D engine so everything in it will be texture-mapped polygons. Using a real-time 3D engine eliminates most of the restrictions we encountered mixing 3D and 2D sprites in the past. We'll be able to do interesting things with cameras to enhance the game's look and playability.

VIE: The players are all 2D sprites and the stadiums are all 3D polygon structures.

Mindscape: Actually, we used both. From the motion capture, we get a skeleton that is the motion itself.

This is attached to pre-made models (Ruth, Aaron, etc.) and rendered into a 3D animation. Once we have this, we convert them to sprites for all the possible views and actions that will happen on screen. This allows for art touch-ups.

boot: Can you edit players? How about teams?

EA Sports: You can create and edit players, as well as draft rosters for the '98 expansion teams. *Triple Play* carries a Major League Baseball, and Major League Baseball Player's Association license, so you get all of the players, and all of the logos. We've thrown in some hidden teams and stadiums too.

We don't allow the player to import updated stats into the game; not because we don't think it's a good idea, but because our database is so big and complex that we'd have a heckuva time updating it and still finding time to work on *TP 99*.

VIE: No.

Mindscape: Player stats aren't readily available, so you can't adjust them, although the skill-point feature lets you increase the talent of a particular player. You can switch their handedness and which arm they throw with.

As far as teams go, there are several teams available, but the most fun will come from drafting a team yourself. You're free to draft any combination of players to give yourself speed, power, whatever you want. You must, however, always play *Aaron vs. Ruth*.

boot: What kind of multiplayer support will you offer?

EA Sports: We decided to go with only two-player multiplayer (via modem or LAN) because baseball is a game of individual confrontations within a team setting. Unlike other sports, baseball on the PC doesn't really lend itself to more players. I can't imagine too many people being excited about playing if they weren't the pitcher or the batter. Until we can make it as much fun to be the right fielder as it is to be the batter, you won't see it.

VIE: *Grand Slam* supports two players head-to-head or up to eight players in the "Tater Tourney." We have not yet announced Internet or LAN support.

Mindscape: *A vs. R* allows for one or two players. With two players, the keyboard and a game controller work well. A multi-port game controller is also available. The interface for playing a one-on-one game accounts for both the pitcher's aim and the batter's aim, without tipping the other off too much.

boot: What kind of attention did you pay to the sound effects?

EA Sports: *TP 98* will have more than 10,000 recorded phrases and this year's speech will blow people away. We've added Buck Martinez (from ESPN) for color commentary to Jim Hughson (from TSN). The two used to broadcast Blue Jay's games together and they have a rapport and friendship that really sounds natural. We have introductions and scouting reports for every player, as well as information about the team, performances on the field, and fun facts about baseball.

The sound effects and crowd are recorded from microphones set up throughout the stadium during the National League Championship Series in St. Louis. The results are the most realistic crowd and sound effects ever created.

VIE: Sound effects are all digital. The play-by-play is a voice talent that we cannot name.

Mindscape: We used QSound to get the stereo quality that gives the user the sensation of actually attending a game at the Polo Grounds, for example. From the sound of the ball off the bat to the call of the umpire—there are several unique umpires each with their own call—we made sure it not only looks like the real thing, but it sounds like it, too.

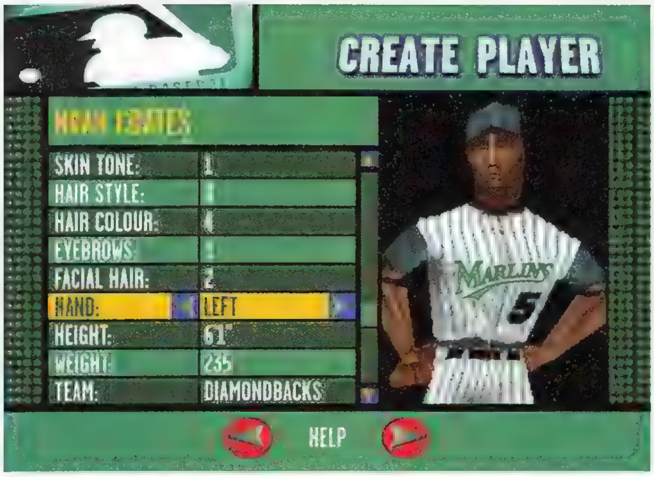
boot: How long will it take to simulate an entire season?

EA Sports: A couple of hours for an entire season. There's nothing I hate more than having to simulate a season overnight.

VIE: About two minutes for an entire season. This is amazingly fast considering that the game simulates every at bat of every game for every team.

Mindscape: Users can simulate an entire season in a matter of seconds. We also offer the ability to simulate a season game by game. Each game takes a few seconds.

boot: What about the computer AI?



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SKIN TONE: 1
HAIR STYLE: [illegible]
HAIR COLOUR: 4
EYEBROWS: [illegible]
FACIAL HAIR: 2
HAND: LEFT
HEIGHT: 6'1"
WEIGHT: 235
TEAM: DIAMONDBACKS

Triple Play 98 features both MLBPA and MLB licences, or you can create your own custom teams and players.

EA Sports: In most games, a loophole in the AI allows you to beat the computer every time. Not in *TP 98*. Each team, as well as each individual player, has his own AI based on his real-life tendencies. Every player and each team will react differently in the same situation. There are no patterns to figure out because the AI uses the game situation and the tendencies of each individual manager to decide on the appropriate action. If you play your defense back, don't be surprised if the batter lays down a bunt for a hit. The game really thinks.

The challenge was to make a single-player game that competes as intelligently as a two-player game.

VIE: Our AI is driven by stats and ratings obtained from Stats inc. Players' decisions are based on the stats and tendencies in our player database. Batters have stats for how hard and high they tend to hit, and where they tend to hit, their favorite pitch, and least favorite pitch.

We also have excellent trade AI. *Grand Slam* does not let you trade poor players for great players. Special AI will consider your offer and decide whether or not it's a fair package. During season play you'll receive telegrams offering trade packages.

Mindscape: We have the strongest AI around. The physics are so true-to-life that we had to figure out a way to deal with gravity. Decisions are made on the fly, based on whether or not the computer thinks it can get you at second, for example. Computer base runners are aggressive, yet smart. The computer learns from what pitches are being hit and picks up on pitcher's tendencies. It can sense when to bring in a new pitcher before the damage is done. This is not just a gimmick to sell units.

boot: Is there a 7th Inning Stretch?

EA Sports: You bet! What's baseball without it? We wanted to do some things to add a little fun and humor to the game so we came up with a bunch of imaginary sponsors. The ads are hilarious.

VIE: No, but it's a good idea. Any suggestions?

Mindscape: There's no actual pause in the program, but the realism will make the true baseball fan stand up and stretch at the appropriate time. You can even sing "Take Me Out to the Ballgame" if you want.

product info

PRODUCT: Triple Play 98
AVAILABLE: april 97
PRICE: TBD
DEVELOPER: EA Sports
PUBLISHER: Electronic Arts
PHONE: 800.245.4525
URL: www.ea.com

PRODUCT: Grand Slam
AVAILABLE: april 97
PRICE: TBD
DEVELOPER: Burst
PUBLISHER: Virgin Interactive Entertainment
PHONE: 800.874.4607
URL: www.vie.com

PRODUCT: Aaron vs. Ruth: Battle of the Big Bats
AVAILABLE: may 97
PRICE: TBD
DEVELOPER: NuFX
PUBLISHER: Mindscape
PHONE: 800.238.3044
URL: www.mindscapegames.com

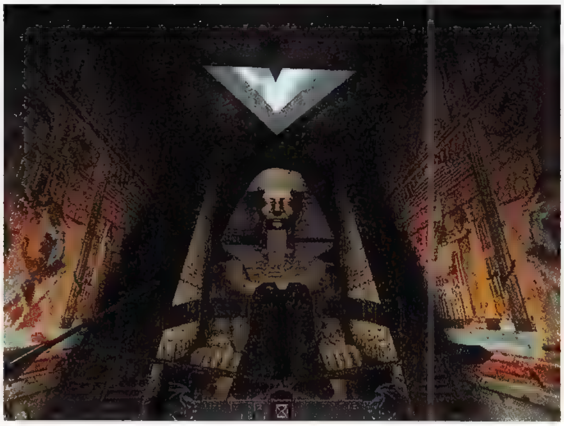
Hexen II

Apocalypse now

Hex nuts unite and prepare to bathe once more in the blood of the unholy, as your quest to destroy the third Serpent Rider, Malloc, takes you into the realms of impossibility where nightmares are realized and magic knows no bounds.

Prepare for the magic-ravaged world of Hexen II.

Harnessing id's Quake *core 3D texture-mapped polygon technology, Raven Software's* ***Brian Raffel*** *shows* boot *what really slithers in the night.*



Hexen II **will have you charting exotic locales searching for Malloc and his accursed horde.**

boot: What's the story of *Hexen II*?

Raffel: With the destruction of D'Sparil and Korax, the forces of Life believed they were free of the Serpent Riders.

They were wrong.

The third Serpent Rider, Malloc, stalked forth into the realm of mankind.

For years, you've lived in hiding, bitterly planning the vengeance you lust for. Death, Pestilence, War, Famine... you will face them all on your quest to destroy Malloc and all that he covets.

Fortunately, you need not face this final battle alone. You've made an uneasy truce with those who were once your enemies: Crusader, Paladin, Assassin, and Necromancer. Choose between one of these four characters or have them all in the game with net play.

We don't want to give too much away, because the rest of the story will unwind around you as you play.

boot: We've seen enough cookie-cutter RPGs lately. What will differentiate the characters in *Hexen II*?

Raffel: Each class will have its own set of four to five weapons and those weapons can be powered up with the Tome of Power. Subtle differences also exist between the classes, such as the speed that the character runs, but the largest difference by far is the experience system.

As characters progress through the levels and gain experience, they'll also gain special abilities, such as an immunity to poison or the ability to hide in shadows, which should add an interesting twist to both solo and multiple play.

boot: What type of new weapons and spells can we expect?

Raffel: Anything you can think of can be made to fit into a spell or a wand. We really liked the way weapons felt in the original *Hexen* and we're trying to get that same feeling in *Hexen II*. Swords, daggers, wands, and staves all play a heavy role in the types of weapons that are going to be used, but we don't want to let out what each weapon will do. They should surprise you, and with the Tome of Power, you should be able to cause major havoc.

boot: Will *Hexen II* be arranged with the same layered inter-level movement as *Hexen* sported?

Raffel: We've set up *Hexen II* exactly the same way *Hexen* was. The levels are centered around a hub level and you have the ability of traversing back and forth through the levels and visiting them multiple times before you can journey to the next hub.

We are currently cutting the "find a switch and pull it" puzzles for more think puzzles, but we don't want to slow down the action of the game. We're trying to balance the shooter with the action role-playing game.

boot: A big factor in the success of an RPG is how immersive the worlds are. How interactive will *Hexen II*'s environments be?

Raffel: Rain, wind, dank caverns, breaking glass, blowing leaves... we hope to make the environment come alive around you. You'll be able to smash through doors, shove barrels out of your way, and soar high above the deadly pitfalls and traps that lay in your path. You'll definitely have to look out for more than monsters.

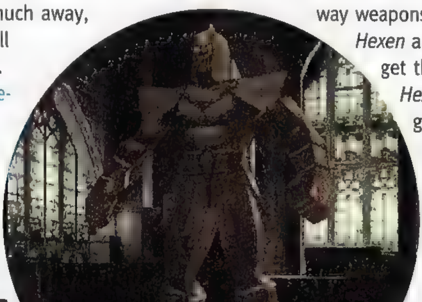
boot: How have you optimized id's core 3D-engine technology? And what kind of 3D hardware acceleration will you be supporting?

Raffel: We've done some work with bsp structures and created all the models in a more accurate fashion. We also implemented John Carmack's Qrad light sourcing. And we're doing an OpenGL version so any cards which support it will notice a difference in speed.

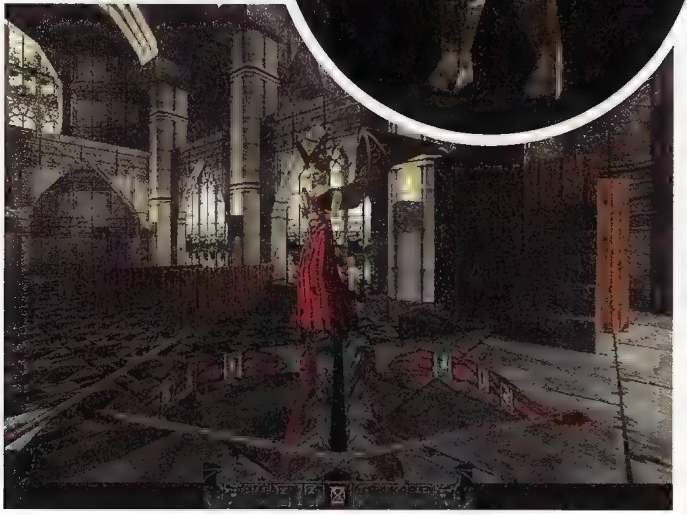
boot: *Quake* was designed as a multiplayer game from the get-go. Is Raven using the same philosophy with *Hexen II*? Or will *Hexen II* focus on satisfying one-player experience as *Hexen* did?

Raffel: Well, our goal in *Hexen* was to make it a challenge for cooperative net games as well, and we will focus on this aspect again with *Hexen II*. So, we kept the core of *Hexen II* as close as possible to the design from *Hexen*. We want this game to be as satisfying for a single player as it will be for 16 players. With all of the new creatures, traps, items, and puzzles we hope to have a game that people will play just to explore.

— Andrew Sanchez



***Hexen II*'s haunting visuals will push first-person actionfests into levels yet unseen. Do you think your arrows have what it takes to put this monstrosity down?**



Polygon crossbows are but one of the many weapons available in *Hexen II*.

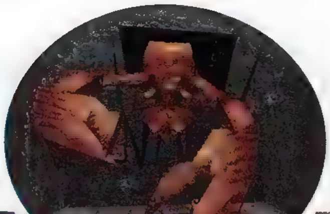
product info

PRICE: TBA
DEVELOPER: Raven Software
PUBLISHER: id Software
PHONE: 800.434.2637
URL: www.ravensoft.com

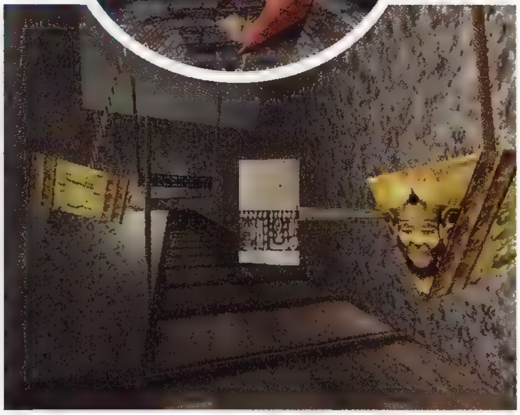
S/W

Montezuma's Return

A polygon blast from the past



There's one satisfying way to beat the giant lobster: Cook him!



***Montezuma's Return* brings the world of side-scrolling platform games into the third dimension.**

Back in the mid '80s, Rob Jaeger's Montezuma's Revenge *pushed the side-scrolling gaming genre to new heights. Now, technology has finally granted him the power to create a truly audacious sequel.* boot *caught up with Jaeger to discuss what 17-odd years will do to a game developer.*

boot: Why a sequel, and why now?

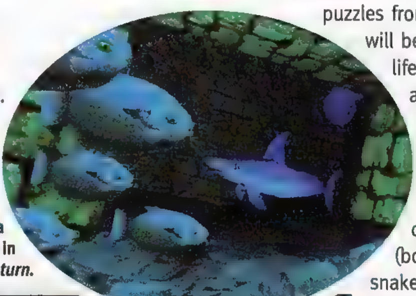
Jaeger: In its day, *Montezuma's Revenge* was a Top-5 hit on practically every platform, with innovative nonlinear gameplay and large, detailed characters. It set the trend for action/platform games for years to come. *Montezuma's Return* is a totally new game, enhanced with stunning 3D graphics, which recaptures the feel and magic of the original game, but with more characters and puzzles.

boot: How will *Montezuma's Return* differ from all the other first-person action games on store shelves?

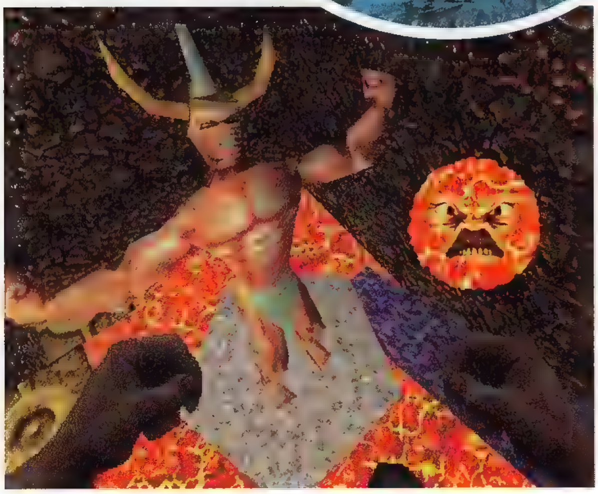
Jaeger: *Montezuma's Return* is the only one with an emphasis on puzzle solving and obstacle navigation. The player will have to learn to climb ropes. They'll navigate fiery pits with the aid of trampolines and trapeze-type devices. You'll have a weapon, but *Montezuma's Return* will stand apart from the plethora of first-person shooters. It's *not* a shooting-oriented game.

Players will have to navigate moving platforms, elevators, and mechanical traps. We have morphing floors and walls. Our advanced physics engine allows us to construct complex environments with such a high degree of flexibility and interaction that it creates exciting new forms of 3D gameplay not yet seen on a PC.

The game is loaded with unique puzzles. For example, in one room there's a giant lobster in a tank. He's too massive to fight and too quick to outmaneuver, but if you can figure out how to divert a lava stream, you may be able cook him. In another scenario, after rescuing a giant frog from a well, he becomes your ally and you'll be able to jump to places that you couldn't previously reach.



You'll plunge headlong into a variety of watery environments in *Montezuma's Return*.



Battling monstrous polygon Aztecs is all part of a day's work.

boot: Should we expect the same wacky "disappearing floor" puzzles that made the original *Montezuma's Revenge* great?

Jaeger: Yes. Many of the puzzles from the original will be brought to life with fully-animated and highly interactive 3D models. Many of the original characters (bouncing skulls, snakes, spiders) will also be revisited in full 3D. Some of the models approach 500 triangles.

boot: How big will the worlds be?

Jaeger: There will be seven major nonlinear areas containing four to five levels each.

boot: What about multiplayer options?

Jaeger: *Montezuma's Return* is a single-player action/adventure game.

boot: You've described *Montezuma's Return* as, "enhanced with stunning 3D graphics." Will the game be entirely 3D, or some sort of hybrid?

Jaeger: The game will use real-time 3D models for every character—including enemies, friends, and the first person. There will be no 2D sprites, but in some cases where an object looks similar from all angles (such as the pearls) we use low-polygon viewer-oriented models, which preserve the bitmap detail of sprites, but avoid the skewing of a 2D model in a 3D world.

boot: Among the throngs of true polygon-based first-person game engines, what makes *Montezuma's Return* special?

Jaeger: We've got a long list of features that haven't been seen before. We're using Phong shading with multiple movable light sources that provide beautiful subtle lighting effects. Characters and rooms can morph and scale. We also support chrome and reflection mapping along with a long list of proprietary special effects. And we support high-resolution graphics modes in high color... with standard hardware.

We currently support the Vérité-based accelerators and will very likely support the 3Dfx and PowerVR. We will absolutely take advantage of MMX technology.

boot: What will be the highest resolution? What about the texture maps?

Jaeger: Currently it is 800x600, but we'll likely support all resolutions before the release.

Most textures are currently 128x128 pixels, but our technology supports larger sizes.

boot: Will the game have more than 256 colors?

Jaeger: Much more. *Montezuma's Return* looks awesome in 256 colors, but in 65k color modes we approach photorealism. And, these modes will all be supported with a *standard* SVGA card.

— Andrew Sanchez

product info

AVAILABLE: july 97
PRICE: TBA
DEVELOPER: Utopia Technologies
PUBLISHER: TBA
PHONE: TBA
URL: www.utopiatech.com

NetStorm

Partly cloudy... with a chance to reign

Titanic Entertainment has teamed with Activision to create NetStorm, *a gaming experience that promises almost unlimited replay value.* Netstorm's *being created under the watchful eye of Titanic's president,* **Ken Demarest**, *whose vision helped forge such legends as* Wing Commander, Ultima VII, *and the cinematic masterpiece,* Bioforge.

Demarest took time out to talk to boot *about the forthcoming maelstrom.*

boot: When did the *NetStorm* concept begin?

Demarest: When Netscape started to catch everyone's attention about two years ago, we decided the Internet had really started to make its mark. Everyone had been predicting it for the last 10 years, and it was finally happening!

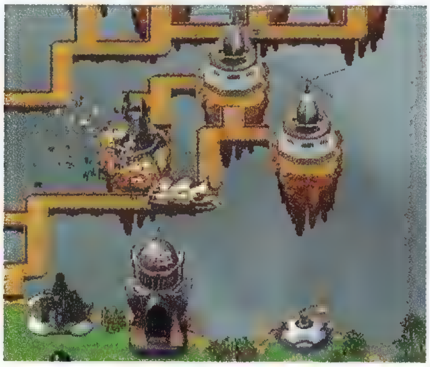
boot: What is the plot of *NetStorm*?

Demarest: *NetStorm* takes place in an airborne world called Nimbus, and the people who live on its islands floating in the sky are called Nimbians. Their universe consists of three "spheres."

At the heart of everything is the Deusphere. The next sphere out is the Pyrosphere. Here storms rage, new islands appear—tossed up from the Deusphere—and the various warring groups gather to engage in fights for new island territory. When a new island appears from the Deusphere, the Nimbians race to be the first to build a Power Vortex there, which can be used to move an island into a new sphere. When the Nimbians need time to prepare for battle they can raise their islands up out of the Pyrosphere and into the third sphere: the Serenisphere, high above the conflict, where they have a chance to build peacefully.

Three Furies—Rain, Wind, and Thunder—are the source of all Storm Power, which is the fundamental essence of all creation.

You are the ruler of a new island and must strive to deliver your people into the Beyond where they can live in peace forever.



The combined attacks prove too much for your Thunder Cannon, as it succumbs to the relentless combat.

boot: How will the single-player campaign differ from the multiplayer?

Demarest: I'm tempted to say that they're essentially the same, except a human opponent is always more clever and resourceful than a computer. To help compensate, you'll be given missions with a strong plot behind them, and each goal you achieve will have importance to your fortress.

The single-player campaign will also bring you along from using just a few units to learning them all. That way even novice players can experience the full game without risking everything online.

boot: The real-time strategy gaming arena is a competitive realm, considering the competition—how will *NetStorm* stand out?

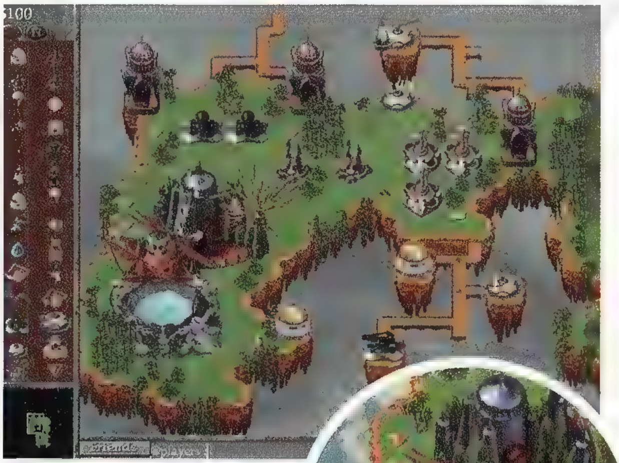
Demarest: Designed from the ground up to be a multiplayer Internet game, *NetStorm* is playable on as little as a 4800 baud modem with no lag. Players can even re-enter games if their ISP temporarily goes down.

The game also features an integrated chat/player matching environment that, for the first time, allows online players to: 1) easily find opponents of equal skill and resource level; 2) easily find past opponents and friends; 3) have true allies and enemies; and 4) make spying and spy information a useful resource.

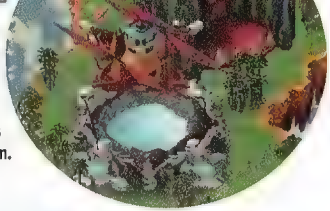
NetStorm's radically different gameplay eliminates micro-management, as unit creation and placement, rather than unit control, are the key. Further, unit design rewards strategic thinking and pre-planning, not simply brute force. With the aid of Storm Power, players are rewarded for initiating attacks—as opposed to other multiplayer games in which the strategy is to hang back during battle, allow other players to weaken themselves, then move in for the kill.

There are 24 unique combat pieces, and each has its own special behavior. Of course, beginning players will only be exposed to about four, and as their fortress grows they can increase the pieces they have access to. In the end, players create their own, unique "technological profile."

Additionally, *NetStorm*'s persistent world allows players to both define their own goals for each battle. These battles have a higher emotional stake as players risk losing their islands with each confrontation (similar to an RPG hero).



Your floating island fortress prepares for battle in *NetStorm*.



An Airship lays siege to your enemy's Thunder Cannon.

boot: But what's going to make *NetStorm*'s head-to-head experience so much more exciting than say... *WarCraft II*?

Demarest: I'd say just about everything. The new position-oriented strategy, the fact that your fortress lasts from one battle to the next, the easy player matching, the spying, the trading, the fact that you're putting part of your fortress on the line in every battle...

And one more thing I just have to mention: In *NetStorm* everything is composed of "Storm Energy" and when you destroy your enemy's units you get the Storm Energy from which they were made. That means you always have an incentive to attack. In *WarCraft* (or any of the many *WarCraft* clones) your tactic is to let your opponents attack each other and then sweep up once they're weak. That isn't fun! You're being rewarded for doing nothing. But when you get the value of what you destroy, you're being rewarded for attacking—and that is fun!

boot: How in-depth will the gameplay be? Will it lean heavily toward resource management or more fun?

Demarest: Fun, fun, fun! I've never seen a development team so devoted to pure fun! Just a month ago, we had to rip out 4,000 lines of code because they just didn't make the game more fun. Now, with so many pieces, there *will* be very deep gameplay—in fact, there are an almost unlimited number of completely valid strategies for winning. You'll just have to play the game to understand!

— *Andrew Sanchez*

product info

AVAILABLE: summer 97
PRICE: TBA
DEVELOPER: Titanic Entertainment
PUBLISHER: Activision
PHONE: 310.473.9200
URL: www.activision.com

DROWNED GOD
CONSPIRACY OF THE AGES
LISTEN TO YOUR EARS
To create the perfect sound for Horus, the Drowned God™ sound designers blew through an eight-inch plastic straw into the studio toilet and recorded it with a condom-wrapped microphone.
Of course, if you had a Bazooka, you already heard that.

Product Information Number 304

boot reviews

KICKIN' THE TIRES ON THE LATEST **HARDWARE** AND TAKIN' THE NEWEST **SOFTWARE** OUT FOR A SPIN

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H/W

Sony PCV-120

More than skin deep

The Sony PCV-120 proves that beauty and brawn can indeed go hand-in-hand. Back in *boot* 01 we previewed Sony's initial foray into the realm of PCs, and now with MMX providing the multimedia horsepower systems need to survive, the PCV-120 is ready to rumble.

Teiyu Goto (responsible for designing Sony's PlayStation) lends his artistic flare to the PCV-120, which is decked out in gray and violet hues—a dramatic eye-catcher. Notice the vertical sliding panel covering the recessed 3.5-inch floppy and Hitachi CDR-8130 16x CD-ROM drive.

The minitower houses major upgrade potential. Popping off the side panel to get at the guts is the simplest system we've ever encountered—a bare-hands affair, no tools required. Intel's Agate ATX form-factor motherboard armed with Intel's 430HX PCIset provides the PCV-120's backbone. For the expansion fanatic three PCI slots, two ISA slots, and one shared PCI/ISA full-length slot shower you with easy accessibility and room to grow. The topmost PCI slot is the only filled slot, but swapping the half-sized 33.6 DSVD PCI modem for a full-length replacement would be a painful proposition—the path is blocked by the motherboard's EIDE connectors.

Integrated into the motherboard is ATI's bootWorthy 3D Rage 2 chipset, locked and loaded with the ImpactTV chip for S-Video/composite output to your TV. Unfortunately, it comes with only 2MB of non-upgradeable EDO-DRAM.

The interior of the PCV-120 provides easy access to the four SIMM slots and expansion bus—but to get to the CPU you'll have to rip out the system's power supply. Hiding under the power supply does have its advantages, as the ATX form-factor case positions a massive fan directly over the CPU's green heat sinks providing much needed airflow to keep that P200 chilled.

In a smooth move that pleased everyone here in the bootLab Sony labels the power supply with a chart detailing the motherboard layout—right down to jumper settings for bus clocking speeds and more. Dual USB ports are also present and accounted for, although a game pad to take advantage of them would have been a plus.

Our growing infatuation with the PCV-120 was dampened when Sony's CPD-100VS multimedia monitor made its appearance. Not that it isn't good (see sidebar), it's the size—*13.9 inches* of usable visual real estate. Sony promises a 17-inch version of this multimedia powerhouse soon. We hope so. Remember, the monitor *is* optional.

Unfortunately, the onboard OPL3 FM-synth sound "solution" is *not* optional. While we couldn't uncover any incompatibilities with the chipset, the omission of wavetable sound kept the PCV-120 from a Kick-Ass award. Given Sony's reputation in audio (and the "A" in "VAIO") we expect no less.

The PCV-120 performs like a champ, cruising through all our benchmarks in style. But the 2MB of video RAM came back to haunt the PCV-120—outgunned by the Polywell 500MX8s (reviewed in *boot* 07) whose 3D Rage 2 came properly armed with 4MB of EDO DRAM. Racing down the roads of Io in Ubisoft's *Pod* yields silky smooth frame rates, easily pinning 30fps with its delicious 64k color palette.

Feelings of 14-inch monitor inadequacies aside, the Sony PCV-120 is a finely tuned piece of PC performance. Considering they're new kids on the computing block, they've one-upped many larger manufacturers by delivering solid performance and upgradeability all wrapped up in one fashionable package.

— *Andrew Sanchez*

+	−
•Easy access to hardware •Simplest panel removal system around •ATI 3D Rage 2 with ImpactTV •Lots of free expansion slots •P200 MMX •Motherboard layout chart on power supply •Two USB ports •Huge bundle	•Yamaha OPL3-SA FM synth •No game controller •14-inch monitor (optional) •Cannot expand video memory

under the hood

the brains

CPU......................200MHz Intel Pentium MMX
L2 Cache.............256K pipeline burst SRAM (external)
RAM......................32MB EDO DRAM (128MB max)
Video...................Integrated ATI 3D Rage 2 chipset with ImpactTV (2MB EDO DRAM)

the brawn

Hard Drive............Western Digital 3.8GB EIDE
CD-ROM................Hitachi 8x CDR-8130 16x IDE-ATAPI CD-ROM drive
Expansion Bus.....Three full-length PCI (one occupied); two ISA; one PCI/ISA shared
Fax/Modem...........33.6Kbps DSVD modem/14.4 fax

the beauty

Monitor................System tested with Sony CPD-100VS 15-inch monitor (sold separately)
Sound card...........Yamaha OPL3-SA Sound System
Video....................1280x1024 256-color max
Speakers..............Custom Sony three-piece subwoofer/satellite system integrated on monitor
Other.....................USB ports (two), Composite/S-Video output

the bundle

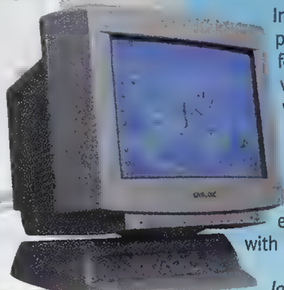
EasyPhoto Phone (MMX) • The Third Dimension (MMX) • Sony Picture Entertainment Video CD sampler • Microsoft Encarta 96 Encyclopedia • Microsoft 3D MovieMaker • Microsoft Bookshelf 1996-97 Edition • Microsoft Works • DeltaPoint Quicksite • Starfish Software Sidekick 95 • PC411 Telephone Directory • Sony Video Phone (receive only) • Oil Change • Quicken SE • Investor Insight • Billboard Music Guide • Blockbuster Guide to Movies & Videos • The Family Doctor • Cartopedia—The Ultimate World Reference Atlas • Compton's Interactive Encyclopedia • The American Heritage Talking Dictionary • Deluxe! Reader Rabbit 1 • MechWarrior 2 ATI 3D Rage Edition • Wipeout • Launch • PhotoStudio 8.0 • The Best Of Microsoft Entertainment Pack

the goods

Sony's PCV-120 comes dressed for success in shades of violet and gray. MMX technology meets the demands of rough-and-tumble multimedia life.

Sony CPD-100VS

Multimedia for the masses?

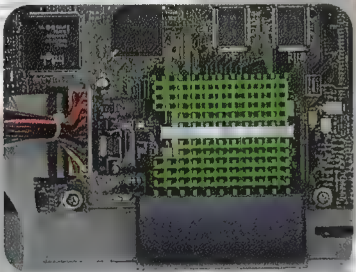


Behind the 13.9-inch Trinitron CRT screen lurks a bevy of fascinating features. Integrated microphone, front-panel push-button controls, comfortable refresh rate for 64k viewing at 1024x768 (75Hz), as well as a custom satellite/subwoofer system come standard on the monitor.

When pushed to its maximum volume levels, the entire speaker system crackles with distortion.

The "subwoofer" (term used *loosely*) is great for midbass fill, but frequencies below 40Hz are lost in the breeze. Mind you, 20Hz is more of a feeling than a sound, but the "woofer" failed to deliver the subterranean goods. Also, the aperture grille vibrates when the sound system pounds out the tunes, resulting in a swimming distortion occurring on screen.

Dot Pitch............................0.25mm
Maximum Viewing Area.....13.9-inches
Resolutions Supported (with PCV-120)
640x480 @ 16 million colors (75Hz)
800x600 @ 16 million colors (75Hz)
1024x768 @ 64k colors (75Hz)
1152x864 @ 64k colors (60Hz)
1280x1024 @ 256 colors (60Hz)
Speaker Setup ....Two full-range stereo satellites @ 3.5watts/channel; one subwoofer mounted in base of monitor @ 10watts, integrated microphone

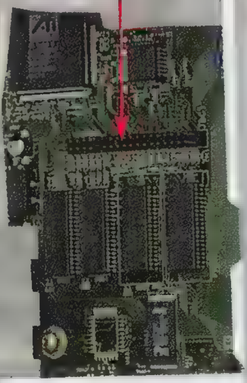


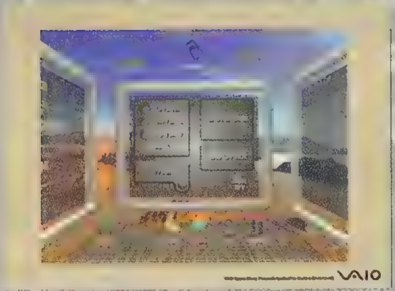
Stayin' Frosty

Under the blow-hardy power supply fan lurks the system's Pentium 200 MMX CPU, receiving constant currents of cooling air between its massive heat sinks.

MPEG & TV & 3D—Oh, Geez!

Sony's choice of integrated video subsystem is a solid solution. The ATI 3D Rage 2 is a good overall performer. If you want hardcore 3D acceleration we recommend adding a dedicated 3D solution such as VideoLogic's PowerVR or 3Dfx's Voodoo on top of the ATI.



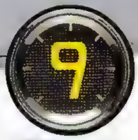


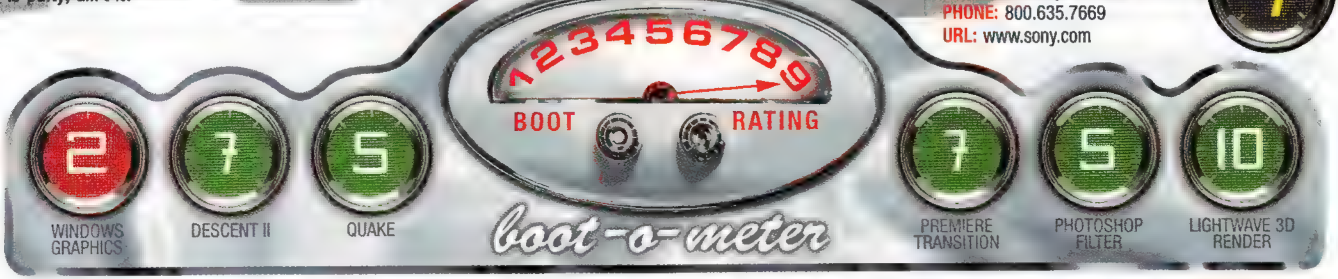
A Kinder, Gentler Interface

You may scoff at the simplistic VAIO Space user interface Sony packs with the PCV-120, but it sure is purty, ain't it?

boot verdict

PRICE: $2,399.99 system; CPD-100VS monitor add $529.99
COMPANY: Sony
PHONE: 800.635.7669
URL: www.sony.com





A complete breakdown of benchmark results is available on the *bootNet*. Point your browser to www.bootnet.com

S/W

Visual **Café**

Get it while it's hot

boot KICK ASS! PRODUCT

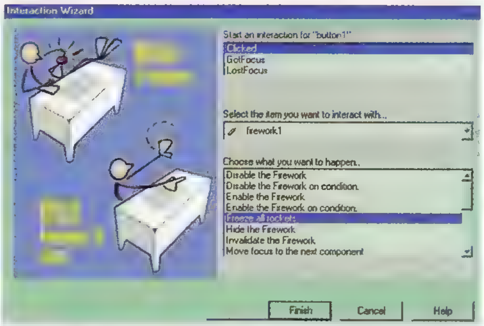
This is the most exciting development tool since sliced time, folks. And it would be so even if it *wasn't* Java-based. That it *is* a Java tool is fantastic icing on what is an already kick-ass cake.

Here's why: Not only does Symantec's *Visual Café* let you lay out Java applets visually, it writes the source code for you in real time; you can actually watch the source change in an open window as you use the Form Designer to add and manipulate widgets in your applet. And the reverse is also true: As you edit Java source, you can see the effects on the appearance of your applet.

What's even more cool is that you're unlikely to find yourself writing Java source in most cases, since *Visual Café* comes with a huge library of drag-and-drop components, including widgets for multimedia playback and almost every graphical interface control you've ever seen.

Setting up interaction between widgets is also a piece of cake, thanks to the Interaction Wizard; just drag a link from one item to another, and you're presented with a clear, straightforward series of dialogs, letting you choose what action generates what response. When you do find yourself editing Java source, you'll find everything you'd expect from a high-end text editor, including syntax coloring, jump-to-method facilities, and top-notch search capabilities.

Did we mention that *Visual Café* sports the fastest JIT (Just-In-Time compiler) on the planet? Or that the debugger supports practically everything imaginable, including remote debugging? How about class and class-hierarchy editors that keep your source updated for you while you rearrange things? It's truly a developer's dream. There's even an included utility that figures out exactly which Java class files you need to upload to your server in order to make an applet available on the Web (no more guessing about class dependencies or wasted server space).



Start an interaction for "button1"
Clicked
GotFocus
LostFocus

Select the item you want to interact with..
firework1

Choose what you want to happen..
Disable the Firework
Disable the Firework on condition.
Enable the Firework
Enable the Firework on condition.
Freeze all rockets
Hide the Firework
Invalidate the Firework
Move focus to the next component

The Interaction Wizard makes quick work of establishing cause-and-effect relationships between widgets.

Visual Café rocks. If you're itching to do Java, this is where to scratch.

— *Neil Redding*

boot verdict

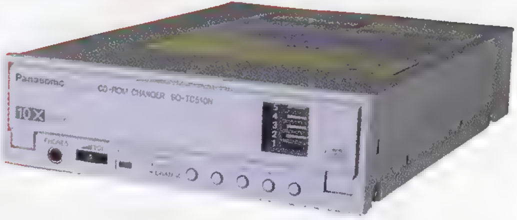
PRICE: $199
DEVELOPER: Symantec Corp.
PUBLISHER: Symantec Corp.
PHONE: 800.441.7234
URL: cafe.symantec.com

10

H/W

Panasonic SQ-TC510N "Big 5" 10x **CD-ROM Changer**

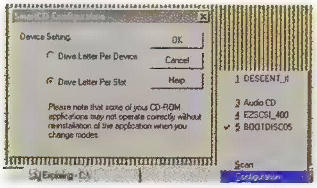
Exceptionally mediocre



Don't be fooled, that's not a magazine in the box, it's actually a thick drawer that pulls out the drive tray.

Tired of constantly swapping discs? Considering suicide because you can't find the fourth disc of *Phantasmagoria 2*? (Trust us, it *isn't* worth it.) Well, the Panasonic ATAPI "Big 5" 10x CD-ROM Changer could be your salvation.

The "Big 5" denotes the number of discs the drive holds and should not be confused with the sporting-goods store of the same name. It's one large drawer housing five drive trays linked to five buttons on the front of the drive; push a button and the corresponding drawer slides out.



Device Setting

○ Drive Letter Per Device
● Drive Letter Per Slot

Please note that some of your CD-ROM applications may not operate correctly without reinstallation of the application when you change modes.

1 DESCENT_II
3 Audio CD
4 EZSCSI_400
✓ 5 BOOTDISC05

Finally, unobtrusive software that is intuitive and easily accessible.

The interface software is intuitive, sitting nicely out of sight in your system tray. It can also be launched via a right click on one of the drive letters from within Explorer or My Computer.

You can run the drive in two modes: one that allocates five drive letters for the five discs loaded, and one that gives just one. The beauty of the latter choice is that it lets you save four of your previous letters for things such as network resources. Changing discs in this mode is easily done through the interface; unfortunately, changing discs between these modes not only requires a reboot but possibly a reinstall of the application on the CD-ROM due to the system change.

The SQ-TC510N is an IDE drive (ATAPI) which, alas, does not support EIDE Bus-Mastering technology. Performance is on par with other drives in its category (see the Wearnes review on page 85). The 38 percent CPU utilization is reasonable for ATAPI drives. Access time clocked in at an impressive 129ms, which is typical for a 10x drive. WinMark 96 throughput delivered lackluster numbers on the average of 868K (keeping in mind that 10x drives should be performing on the 1500K level). Our intensive hard drive copy test that moves 579MB was completed in a snappy 6 minutes and 14 seconds, beating the Wearnes 10x by 28 seconds. Changing discs takes around seven seconds with just a few seconds more to cache the contents of the first directory.

This drive performed flawlessly in the OSR/1 version of Win95, but choked in OSR/2 where it tied up the system while the drive endlessly shuffled between trays, essentially locking up the system. Panasonic concedes that this is a problem and hopes to have a fix for it soon, hopefully by the time you read this review.

— *Sean Cleveland*

boot verdict

PRICE: $299
COMPANY: Panasonic
PHONE: 201.348.7000
URL: www.panasonic.com

6

S/W

Diablo

Feed the obsession

boot KICK ASS! PRODUCT

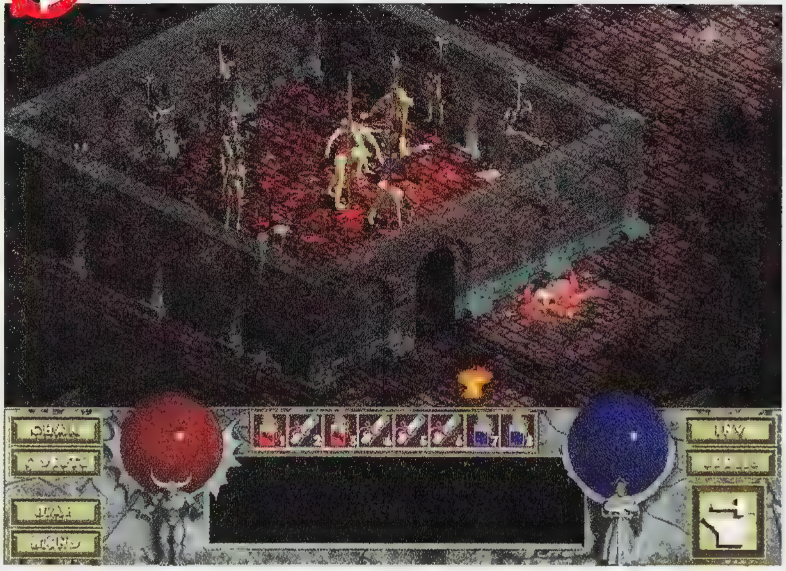
Enter the chaotic world of *Diablo*—a gore-laden trip into the dark recesses of dungeoneering. At the core of *Diablo* is a classic battle between good (you) and evil (the monsters). Put simply: It's a kill or be killed thang. But what makes *Diablo* so appealing is the incredible overall package that Blizzard delivers into your hot and sweaty hands.

Tightly balancing between stats-enhancing RPG elements and frantic hack-and-slash action, there are more than 40 major quests in *Diablo*. You'll only encounter some four of them during any single-player bout, but if you're thinking you'll memorize *Diablo*'s twisting catacombs, think again. The dungeons are randomly generated for every game, so it's never the same adventure twice. Thankfully, auto-mapping is available for those who need it.

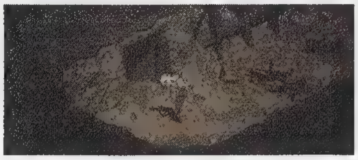
Choose from three distinct characters, each armed with a variety of both magical and mundane weaponry. Your mission is simple: Rid the kingdom of Khandaras of the demonic fiend Diablo and his hordes of undead warriors. Survival will grant you more strength, dexterity, vitality, magic, and life.

Beneath the ruined town of Tristram, *Diablo* reveals a super-sharp 640x480, 256-color SVGA landscape. You can almost smell the death and decay as you battle your way through a three-quarter isometric view reminiscent of *Crusader: No Remorse*. Unlike *C:NR*'s static screens, *Diablo's* battlefield scrolls with the player, constantly centering on the character and the surrounding pool of light that follows your adventurer. Every element of the game, from the craggy dungeon walls to the hordes of gibbering monstrosities, are lavishly pre-rendered with mega frames of animation, all churned out by *3D Studio Max*. Since the view does not rotate—à la *Syndicate Wars*—the *Diablo* engine renders obstructing walls semitransparent. Unfortunately, some obstacles, such as crypts, aren't see-through and may hide loot.

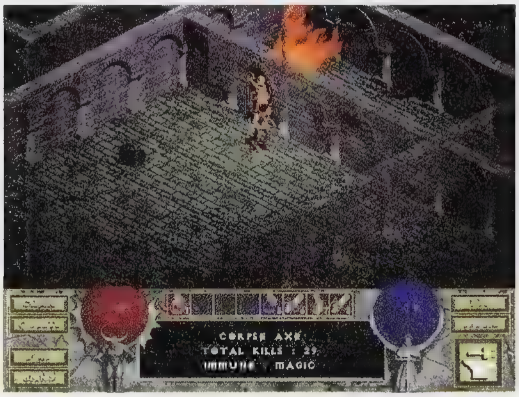
TRY IT ON THE DISC



Ding, dong, the Butcher's dead! *Diablo* is filled to the brim with all manner of demons and fiends.



***Diablo*'s sharp graphics will have you wielding weapons against the forces of damnation.**



You'll encounter lots of nasties as you work your way through the dark and spooky catacombs of *Diablo*.

To receive scrolls and important artifacts, you must kill the critters you find in the dark. To aid in your combat, exotic weapons, including the Butcher's Meat Cleaver, Executioner's Blade, and the Hellslayer, are yours for the taking. And you'll need all the firepower you can muster to tackle the more than 100 nasty denizens of the dungeons, including Hell Spawn, Toad Demons, and Storm Riders.

While solitary exploring is engaging, *Diablo* thrives on multiplayer mayhem. Whether via Blizzard's Battle.net or on a LAN, *Diablo* is a totally different experience when you sally forth with fellow *Diablo* disciples. You'll quickly learn that cooperation can be as much fun as deathmatching.

As a team, you can help one another in many ways, such as healing each other, fixing damaged weapons—even engaging in friendly trading. Imagine *Gauntlet* on massive steroids, and you'll get an idea of what's available to would-be warriors. Communication is essential—especially when a party splits up, so don't be afraid to scream for help if you've discovered a coven of zombies and you're low on health potions.

The digital music and sound effects in *Diablo* are awesome, and the use of DirectSound (for realistic panning effects and monster proximity) are chillingly effective. In fact, the Butcher's constant taunts of "Fresh meat!" may convince you to become a vegetarian.

Diablo is simply one of the best games *ever.*

— Brad Craig

The Worst Enemy in Diablo: Latency!

You don't have to face the darkness alone. Team up with as many as four friends (or foes) and battle beneath Tristram in *Diablo*, in either cooperative mode or duel mode. If you're feeling particularly beneficent, you can leave scrolls, potions, and weapons for your friends to use in their fight for the destruction of evil.

Unlike single-player mode, multiplayer game characters are saved periodically (that's why Save and Load aren't in the menu.) While multiplayer games are damn addicting, they are limited by the quality of connections for all the systems involved. Latency, poor cabling, line noise, and heavy traffic all affect the game. Blizzard's free Battle.net service supports players from around the world, and requires a 32-bit TCP/IP connection to the Internet.

checklist

Win95 native .... ☑

DirectX
- DirectDraw .... ☑
- DirectSound .... ☑

Multiplayer
- LAN .... ☑
- Modem .... ☑
- Internet .... ☑

boot verdict

PRICE: $49.95
DEVELOPER: Blizzard North
PUBLISHER: Blizzard
PHONE: 800.953.7669
URL: www.blizzard.com

10

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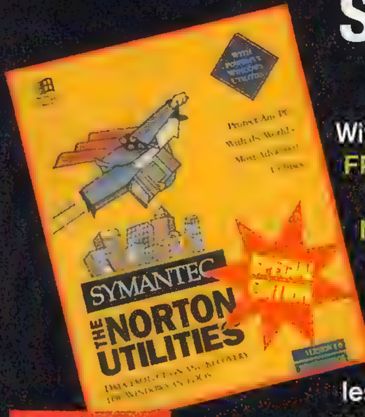

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boot

H/W

IBM ThinkPad 760E

Fuel-injected performance

The firm ride and high-rpm performance of this lap rocket demand attention. This is no marginal performer. Weighing in at a mere 6.4 pounds, the 760E hangs tight through the corners with all but the most burly of notebooks. The carbon-fiber frame contains a system that delivers high-end horsepower as well as steady reliability and upgrading ease.

The notebook's dual overhead cam, 150MHz Pentium puts out a strong performance coupled with the 256K pipeline burst cache. Complementing the air-cooled engine is 16MB of EDO RAM on an easily accessible DIMM adapter with two open sockets for memory expansion that tops out at a whopping 104MB.

Still, don't expect the 760E to burn monstrous multimedia rubber. Even though it rips through the gears at rates matching the best notebooks we've seen, the 760 series was conceived as a sporty new corporate notebook rather than a portable multimedia rocket. The tuning is focused on midrange business application power rather than multimedia acceleration.

A full-front fairing in the form of a 12.1-inch active-matrix display serves up an array of 1024x768 brightly lit pixels at a maximum 16-bit color depth. Unfortunately, the Trident Cyber 9385/82 video subsystem runs clunky, with the chipset failing to match the balls-out performance the rest of the system delivers. During performance-intensive testing, discernible screen refresh time-outs occurred several times. This is unthinkable from a video subsystem with 2MB VRAM. Another black mark falls on the Cyber chipset's failure to provide built-in VESA 2.0 support, limiting DOS video resolutions to a few settings.

Engine rumble is masked by the timid one-inch speakers that are mounted in each corner of the wrist rest, driven by the unimpressive audio power of the MDSP2780 Mwave Digital Signal Processor. While the chip is notable in scope, combining 16-bit wavetable sound, MIDI synth, and a 28.8Kbps fax/modem—the software emulation of these features looses traction, with a discernable flattening of emulated tones that's especially noticeable in DOS games. Since they share the same hardware resources, concurrent use of all the chip's features has its restrictions. For example, when you're using the modem, you can't use the MIDI audio. The upside is that the software on the Mwave chip is upgradeable, bringing the 28.8 modem to 33.6 for example (with a free upgrade from IBM).

The new chassis design in the 760 series focuses on keyboard raisers to cushion the ride and offer a better typing angle. The keyboard itself offers 85 full-size keys for ham-handed folk, without blocking the speakers mounted on the deck. Instrumentation consists of a simple LCD panel that displays battery power by either percentage or remaining minutes, along with other system indicators. Clearly lit signals sit at the rear to inform any would-be tailgater about the battery status and Sleep modes when the case is closed. The slide volume and brightness controls are within easy reach, set to the side and base of the display.

As it turns out, IBM has crafted a terrific notebook for all but the most multimedia-intensive performances. The finished product runs *Quake* at 10fps; blows through a hefty *LightWave 3D* render in less than two minutes; knocks off an 11-second quarter mile; and tops out at 150 mph. But you've gotta have a real need for speed because pricing on this baby starts at $4,999, and that's *without* a CD-ROM drive.

— *Sean Downey*

under the hood

the brains

CPU	Intel Pentium 150MHz
L2 Cache	256K pipeline burst
RAM	16MB EDO RAM (104MB max)
Video	Trident Cyber 9385/82 PCI with 2MB VRAM

the brawn

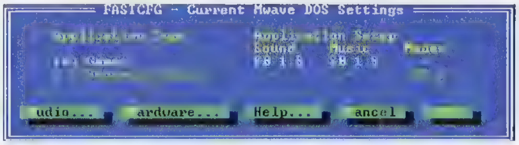
Hard Drive	2.1GB EIDE
CD-ROM	Optional Teac 6x EIDE ($395)
Expansion Bus	Two PCMCIA Type I/II or one Type III
Lap Weight	6 pounds, 4.7 ounces
Carrying Weight	7 pounds, 4.3 ounces

the beauty

Display	12.1-inch active matrix
Sound	Mwave SoundBlaster-compatible audio
Video	1024x768 16-bit color (1280x1024 256 colors on external display)
Speakers	Stereo, with headphone jack
Communications	28.8 DSVD fax/modem, IrDA-compliant infrared port

Yeah, But Does it Do DOS?

In native DOS sessions the FASTCFG command allows you to configure SoundBlaster sound for DOS apps as well as giving you full access to modem commands.

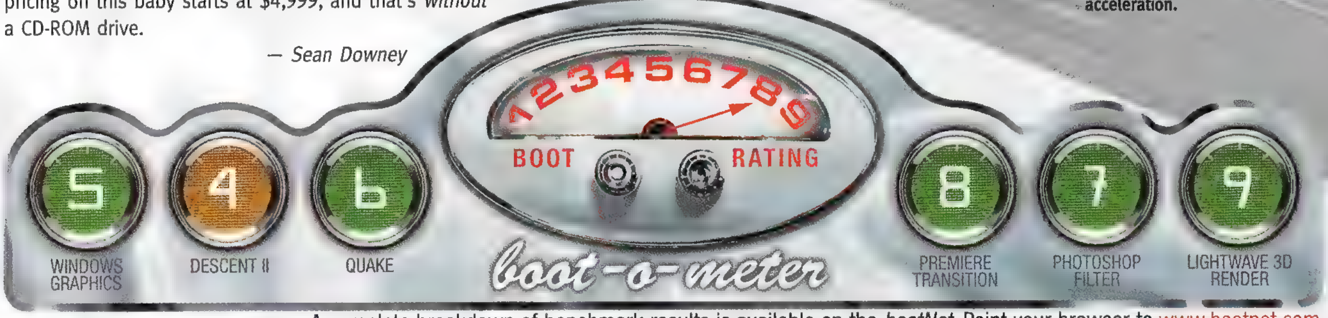


Red to Positive, Black to Negative

Weighing in at less than a pound and sporting the same basic black, the power supply makes a nice accessory for your travel enjoyment.

One Down and Five Up

The TrackPoint 3 flies through the gears like greased lightning, and both mouse buttons lock down for permanent acceleration.



A complete breakdown of benchmark results is available on the *bootNet.* Point your browser to www.bootnet.com

the bundle

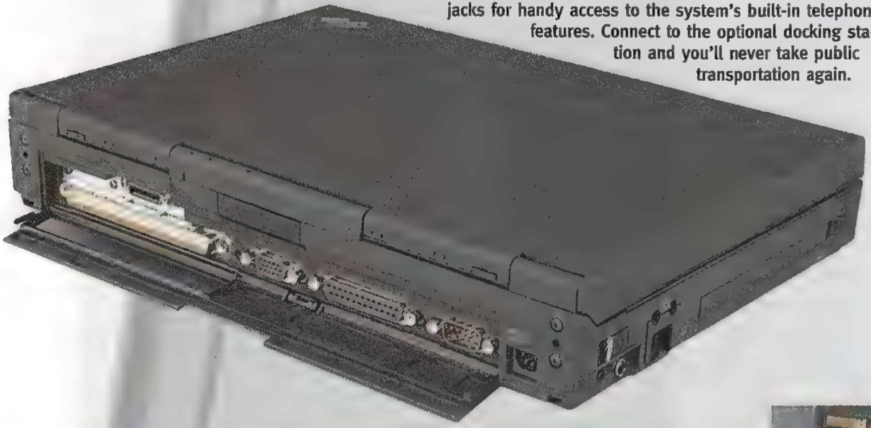
Windows 95 OSR/1 • Lotus Smart Suite 4.0 (1-2-3, Word Pro, Approach, Freelance Graphics, Organizer) • CompuServe • FaxWorks • TranXit2 • NetFinity

real-world battery life

01:48:17

Where's the Gas Tank?

You won't find it back here, but you will find the serial port, parallel port, external monitor, PS/2, IrDA, and external floppy drive. The 760E also sports two PCMCIA slots that can accommodate two Type II or one Type I device. Around the side are modem, microphone, and headphone jacks for handy access to the system's built-in telephony features. Connect to the optional docking station and you'll never take public transportation again.

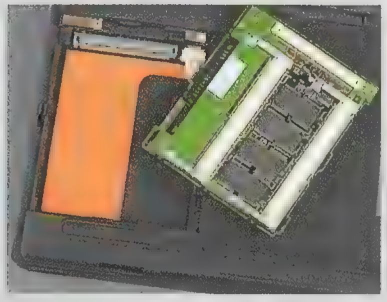


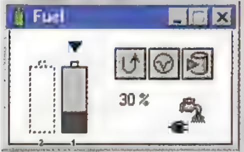
the goods

We recommend wearing your helmet while computing with the ThinkPad 760E.

Opening Up the Throttle

Undo the security latch and slide open the cover to find a DIMM adapter with two open slots, and a thirst for more RAM.





Pop Top Fuel Gauge

The 760E's lithium-ion battery pack is Win95 compliant, and can use the built-in power management utilities, but to really squeeze all the juice out of it use IBM's own fuel-gauge program. It displays the current power mode, percentage and duration of remaining power, as well as allowing quick access to Suspend and Hibernation modes, and a speedy way to discharge your battery. It also prompts you when there's less than 10 minutes of power left.

Easy Access Sliders

Brightness and volume control are just a thumb flick away.

When Chrome Pipes Cease to be All the Rage

The frame easily handles performance upgrades. Adding the optional CD-ROM is as simple as lifting the keyboard, removing the floppy drive, and slapping in the CD-ROM drive. You can also add a second battery or a second hard drive in the same bay.

+

- Brilliant 1024x768 display
- Built-in 28.8Kbps modem
- 4MB/sec IrDA-compliant infrared port
- Excellent expandability access
- Docking station port
- Easy access to DIMM slot

–

- Poor sound quality from the dinky speakers
- Less than dazzling video subsystem
- CD-ROM drive not included
- Pricey

boot verdict

PRICE: $4,999
COMPANY: IBM
PHONE: 800.722.2227
URL: www.pc.ibm.com

8

H/W

VideoLogic **Apocalypse 3D**

Different is good

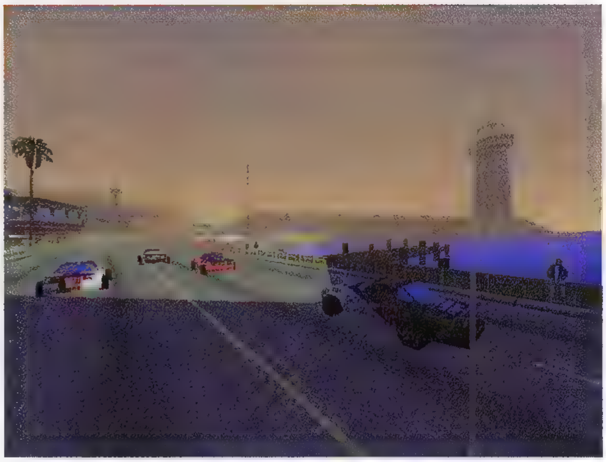
The PowerVR PCX1 chip powering the VideoLogic Apocalypse 3D is radically different from all other 3D chips, and that's both its strength and its weakness.

Instead of polygons, the PCX1 works with 3D space structures called "infinite planes," and this is how it can do things no other 3D chip currently can—such as real-time shadows and spotlights. But the PCX1 lacks texture filtering—a standard feature on even the most basic 3D accelerators. Despite this, in the case of the Apocalypse 3D: Different is good.

Another radical difference between the PCX1 and traditional 3D architectures is that the PowerVR needs no Z-buffer. Instead, the chip's 32 parallel processing paths in an image synthesis processor (ISP) take in the geometry data for a whole scene and output 32x32 pixel chunks to the on-chip texture and shading processor (TSP) to be rendered and drawn onto the screen. Not only does this technique obviate the need for Z-buffer memory, it also results in the rendering of only visible pixels. With a traditional Z-buffer, time is wasted rendering pixels that are later obscured. This efficiency allows the PCX1 to render complex scenes, even at 800x600. Other accelerators bog down with memory bandwidth limitations at these kinds of resolutions.

The Apocalypse 3D is a 3D-only accelerator, and it works in conjunction with just about any recent 2D graphics card. However, unlike the 3D-only accelerators based upon the 3Dfx Voodoo chip, the Apocalypse 3D does not chain onto your graphics card's VGA-out, but writes directly into your 2D card's frame buffer over the PCI bus. This has a nice side effect: The Apocalypse 3D doesn't need a frame buffer of its own. This allows it to use its entire 4MB of SDRAM for nothing but texture storage.

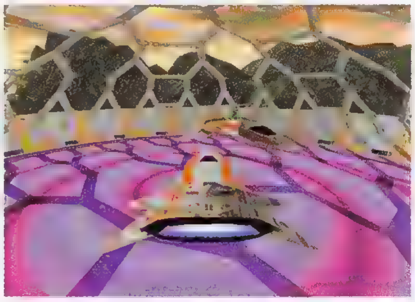
Another unexpected side effect is how well the Apocalypse 3D works with an ATI 3D Xpression+ PC2TV—the ATI card flawlessly converts all the Apocalypse 3D action into a television signal, and the bundled copy of *Ultim@te Race* looks stunning on a big screen television.



Light volume rendering (like these headlights in *Ultim@te Race*) and real-time shadows are two of the features in which the PowerVR excels.

In addition to Mindscape's *Ultim@te Race*, the Apocalypse 3D comes bundled with a specially enhanced version of *Mech-Warrior 2* from Activision. Both games are impressive, and *Ultim@te Race*, in particular, shows off the card—running fast and beautiful at 800x600.

VideoLogic has instituted a game labeling system to tell you at a glance which games on the store shelf work with the PowerVR and how aggressively it implements the technology. "PowerVR Accelerated" titles are just Direct-3D games; "PowerVR Enhanced" games are Direct3D games that take advantage of special features provided by the proprietary Power-SGL API; "PowerVR Extreme" games (such as *Ultim@te Race*) have been totally OpenSGL-enhanced and, to earn the badge, they must run at 30fps at 800x600 resolution and use many PowerVR-specific features. Since the PowerVR chip has been out in Japan for six months now, there are already several Enhanced titles currently being translated for U.S. consumption.

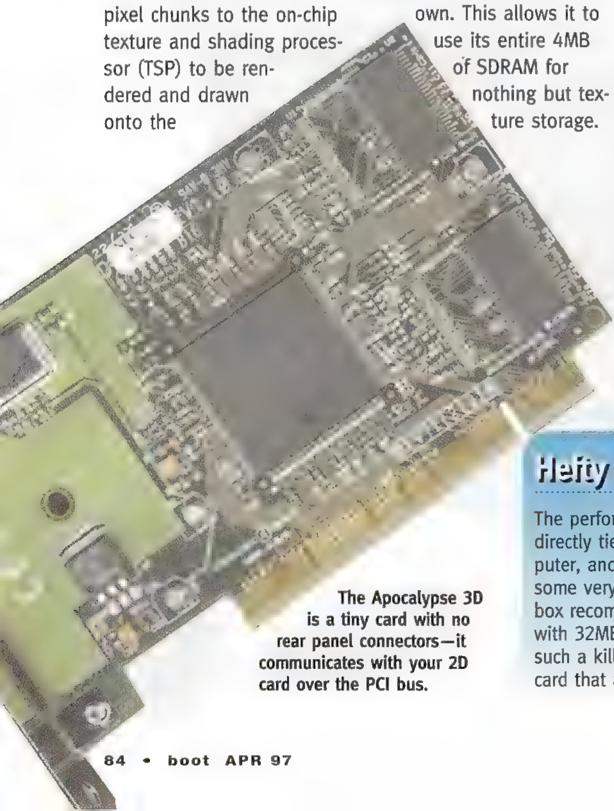


Be sure to try out the demos on the Apocalypse 3D disc—they really show off what the PowerVR can do. The real-time shadowing and colored fog is particularly impressive!

The Apocalypse 3D would have certainly been a Kick-Ass product if *only* VideoLogic had included proper filtering. Even with 4MB to store high-res textures, up-close chunkiness can't be completely hidden. Fortunately, NEC and VideoLogic are aware of this shortcoming, and a new PowerVR chip called the PCX2 should be out later this year with filtering galore. Until then, the current Apocalypse 3D remains an excellent performer at a great price. It definitely belongs on any short list, along with the 2D/3D Rendition-powered cards and the more expensive 3Dfx-based brutes.

This card most certainly rocks.

— Chris Dunphy



The Apocalypse 3D is a tiny card with no rear panel connectors—it communicates with your 2D card over the PCI bus.

Hefty Requirements

The performance of the PowerVR chip is directly tied to the speed of your computer, and thus the Apocalypse 3D has some very hefty host requirements: The box recommends that you have a P166+ with 32MB or more of RAM. If you have such a killer system, this may be the 3D card that at last makes it complete.

boot verdict

PRICE: $199
COMPANY: VideoLogic
PHONE: 800.578.5644
URL: www.videologic.com

9

H/w

U.S. Robotics PalmPilot

Love is in the air... again

Easily one of the sexiest products of 1996, the original Pilot PDA garnered a *boot* Kick-Ass award and showed up prominently in many a *boot* editor's year-end Lust List for best products of the year.

Well, U.S. Robotics has a new object of desire to vie for our affections: the PalmPilot. This successor to the Pilot adds much-needed backlighting, e-mail connectivity, and additional memory to the original design; along with across-the-board enhancements. Since all of this has been added without sacrificing the grace and practicality of the original, the PalmPilot has all the makings of a real siren.

The brightest idea added to the PalmPilot is the electroluminescent backlight (like those used in Timex's Indiglo watch line) for the Pilot's 160x160 monochrome screen. Given the handy nature of the Pilot, the biggest frustration with the original was the inability to jot notes while sitting in movie theaters or in dimly-lit clubs, or to just grab it off the nightstand and record that brilliant idea that you'll undoubtedly forget by the morning... without turning on the lamp. The even, bright field answers those prayers and the energy efficient technology has minimal impact on the two- to three-month life span of the two AAA batteries that fuel the PalmPilot.

Also welcomed is the doubling of memory to both versions of the PDA. The 256K model 1000 and the 512K model 5000 are upgraded to 512K and 1MB respectively. (Owners of those previous models can upgrade to 1MB and receive all the new and enhanced software for only $99—although this means sacrificing the awesome backlight feature.) Given the dramatic economy of Pilot software (the Palm OS that drives the hardware only requires 64K) and the fact that most apps hover below the 30K mark—many sporting only single-digit memory requirements, this should be more than sufficient for even the hardest of the hardcore. A very challenging version of *Reversi* is freely downloadable (and is included on this month's *bootDisc*) and consumes a meager 8K.

The system still centers around the most effective handwriting recognition software around, *Graffiti*. Flowing through the PalmPilot's 32-bit software architecture running on a Dragonball 68328 processor, it's not hard to average 30 words a minute. Who needs a keyboard doubling the size (and weight) of a PDA?

Picking up where the original Pilot's HotSync intelligent synchronization system left off, the PalmPilot adds a portable wired modem option to the previous cradle connection scheme, allowing more flexible access to your data on the road or even around the office via TCP/IP networks. The Network HotSync option kit, giving PalmPilots access across LANs, WANs, and the Internet, runs at $69. The $129 snap-on PalmPilot Modem gives users dial-up access to their desktop for remote synchronization with HotSync connections averaging two minutes, including the exchange of e-mail.

It's déjà vu all over again. The new PalmPilot looks almost identical to its PDA predecessor and can even use the prior version's cradle for HotSyncs. Simply drop it in and exchange all your e-mail.

With support for MAPI and VIM e-mail standards, the PalmPilot allows users to siphon their incoming messages to the PDA, read them, and draft both replies and new messages, which can be sent at the next local or remote HotSync. The PalmPilot supports Microsoft *Mail*, *Exchange*, and *Outlook* programs, as well as Lotus *cc:Mail* with support planned for Lotus *Notes*, Novell *Groupwise*, and *Eudora*. POP3 Internet e-mail is handled through Microsoft *Exchange*.

The new PalmPilot is compatible with the existing Pilot software library, which now numbers over 70 commercial and shareware titles. Additionally, many desktop software packages such as Symantec's *ACT! 3.0*, Lotus *Notes*, NetManage *ECCO Pro 4.0*, Starfish's *Internet Sidekick*, NowSoftware's *Now-up-to-Date*, and *Goldmine* have links that enable one-button synchronization with the PalmPilot through a scheme known as "conduits." Additional programs from Microsoft and Lotus can be synchronized via Puma Software's *IntelliSync* utility.

While these enhancements only make us look forward even more to the first Pilot with a color screen (or multi-level greyscale), better sound, an alphanumeric pager line, or an IrDA port there's no denying that this good thing just keeps getting better. With the addition of enhanced versions of the PIM software that inhabited the original and a new expense tracking package in the same tiny 5.7-ounce (including batteries) package as the original, the love is back. Look forward to a second honeymoon.

— Brad Dosland

boot verdict

PRICE: $299 (Personal); $399 (Professional)
COMPANY: U.S. Robotics
PHONE: 800.881.7256
URL: www.usr.com/palm

9

Acer Aspire 2751

Low aspirations...

The first thing you notice about the Acer Aspire 2751 is the holes. The artistic pattern of tiny ventilation holes in both the monitor and the case look as if the machine is suffering severe salt rot. While the Aspire 2751 isn't rotten to the core, it does have some serious flaws and many minor annoyances, which will leave you feeling empty. You just expect more from this sleek MMX system.

Many of the 2751's features seem fairly innovative. Instead of a power button, there's only a "quick-start" button on the case. A press of that button instantly puts the computer to sleep. Another press and, three seconds later, you're ready to go again, right where you left off. Seems like a nifty power-saving feature until you realize that all the quick-start circuitry is doing is spinning down the hard drive and triggering the monitor to go into suspend mode. The CPU, fans, and everything in the case stay fully powered and active. And if the machine crashes, there is no reset button. So to force a power down, you have to hold the quick-start button down for four seconds. Keep this in mind, because the only other way to reset after a lockup is to pull the plug.

The choice of the ATI 3D Rage 2 was a wise one for a multimedia machine—what with its unsurpassed video scaling and color space support for MPEG and AVI playback. But why Acer didn't go the extra mile and enable television-out with the addition of ATI's ImpactTV chip puzzles us. (Sony provided S-Video and composite outs for the Rage 2 in their PCV-120.) ATI's AMC feature connector is provided on the 2751's motherboard, but it's hidden underneath the slot riser card—so adding a TV tuner or capture card is a real chore. Thankfully, the onboard graphics solution is smart enough to duck out of the way automatically if you add a new PCI graphics card.

An IBM Mwave-powered card acts as both sound card and modem in the Aspire 2751, but it's in way over its head when it comes to DOS games. We had little success getting any games to produce even a peep when booted into DOS, and even under a DOS shell we had constant headaches getting audio to work. In this age of Windows and Direct Audio, DOS support and SoundBlaster compatibility may not be as important as they once were, but what made Acer think they could get away without it on a home machine? All is fine within Windows, and the card delivers solid wavetable MIDI and digital sound playback. The speakers built into the monitor do a good job reproducing difficult sounds, but lack serious bass. On a positive note, they didn't distort the screen image, even when cranked. An optional matching subwoofer is available from Acer for $69.

To test your MMX power, Acer bundles two MMX-enhanced titles from Viacom, *DeathDrome* and *SlamScape*. These games look like they should run on a 486, and do little to show the system in a good light. MMX-enhanced *EasyPhoto* would be more fun to play with.

Another PC magazine enthusiastically recommended this machine "for those who don't need top-notch performance." *boot* readers, on the other hand, would be well advised to steer clear.

— *Chris Dunphy*

under the hood

the brains

CPU	200MHz Intel Pentium with MMX
L2 Cache	256K pipeline burst
RAM	32MB EDO DRAM (128MB max)
Video	ATI 3D Rage 2 with 2MB EDO DRAM

the brawn

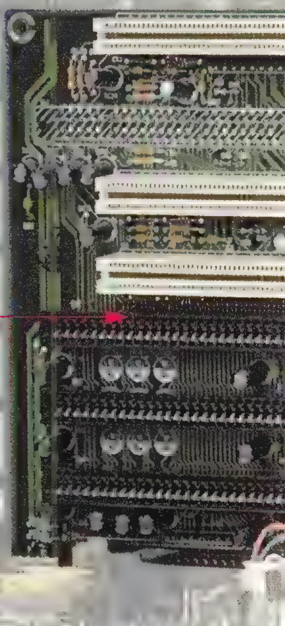
Hard Drive	2GB Seagate Medalist 2132
CD-ROM	16x Maximum Speed Acer
Expansion Bus	Three PCI slots (all open, one shared); four ISA slots (one taken, one shared)
Fax/Modem	IBM Mwave 33.6Kbps, upgradeable to DSVD and 56Kbps

the beauty

Monitor	AcerView 77is 17-inch monitor (15.7-inch viewable, 0.27mm dot pitch)
Sound	IBM Mwave with DSP driven wavetable
Speakers	Integrated into monitor, 10W per channel (no subwoofer)
Other	Microphone built into monitor casing

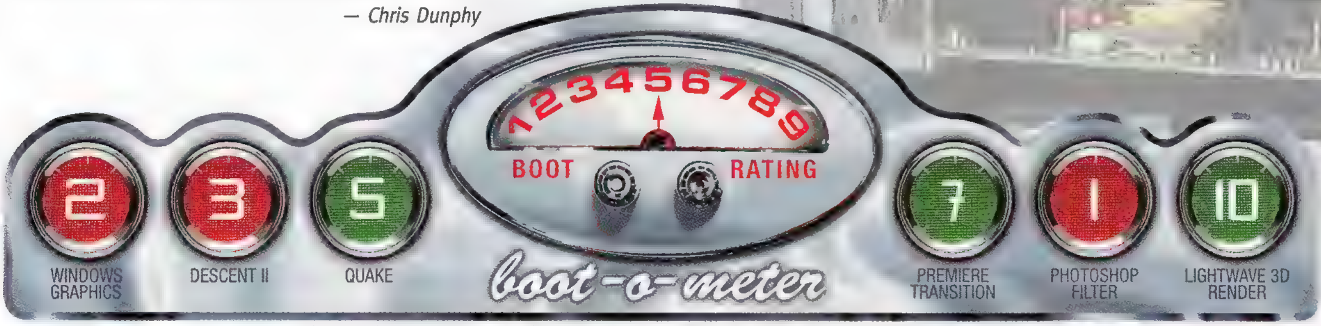
Auto Adjuster

The default ACE interface at bootup is nothing but a glorified program launcher; still, it *is* well-designed and easy to use. And, to its credit, it even automatically adjusts to different screen resolutions.



Rotten Riser

A daughtercard parallel to the main board keeps all the slots above the fray and allows them to support full-length cards. Unfortunately, the daughtercard also blocks access to the AMC media connector and CPU jumpers—and the motherboard's proprietary form factor means you will never be able to replace it.



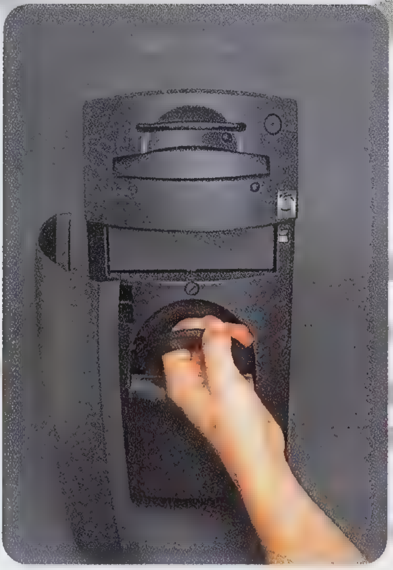
A complete breakdown of benchmark results is available on the *bootNet.* Point your browser to www.bootnet.com

the bundle

Acer Telephony Suite • Microsoft Works • Microsoft Money 5.0 Home Banking Edition • EasyPhoto • PrintMaster Gold • Infopedia • Tyrian • DeathDrome (MMX) • SlamScape (MMX)

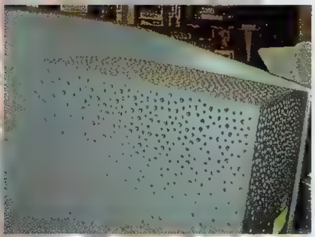
the goods

The Acer Aspire 2751's poor interior design, lackluster performance, and weak software bundle make this a machine to avoid despite its low price and nice specs.



Custom Front

The custom front bezel work may look cool, but you'll be hard pressed to find a replacement CD-ROM that will fit the oddly shaped opening. Fortunately, there is a standard-sized drive bay hidden behind the front door. To remove the case just grab this handle and yank—no screws needed.

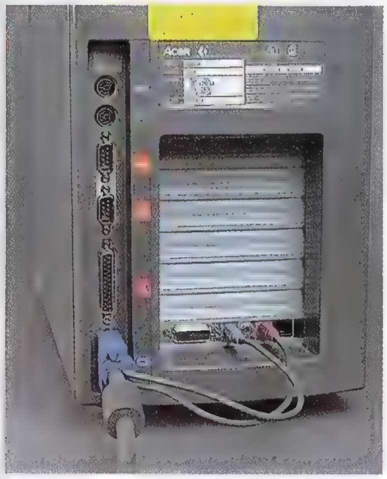


Swiss Cheese

The "stylish" cases of the tower and the monitor are peppered with decorative holes. Perhaps this helps make up for the lack of a proper fan to cool the interior.

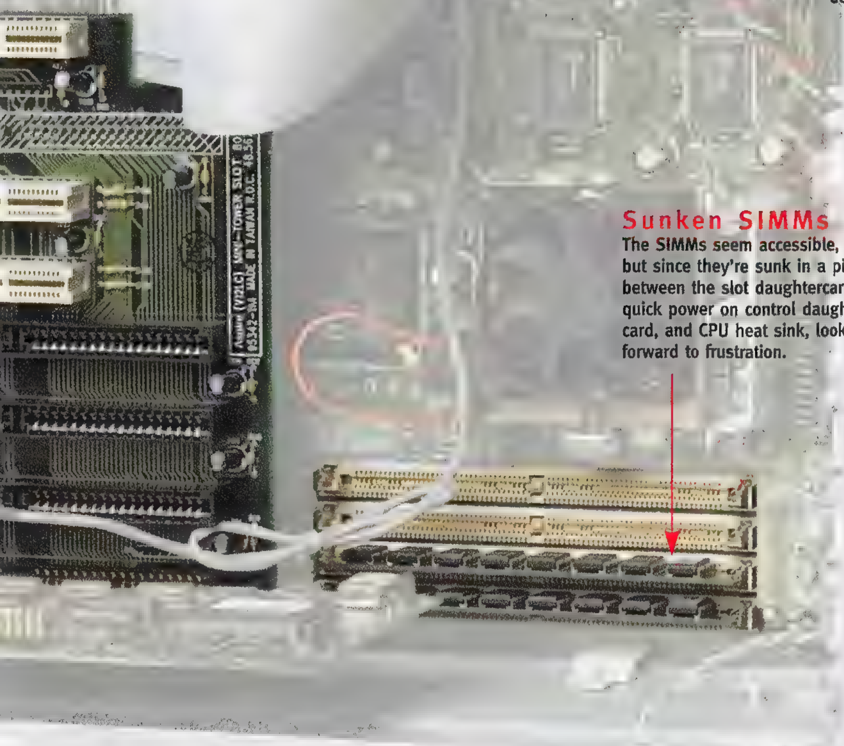
Deep Recess

The entire 2751 case is shrouded in an inch of plastic, which makes working with the rear external connectors a job for thin and nimble fingers (but having the audio lines from the monitor share the VGA cable does cut down on cabling mess).



Sunken SIMMs

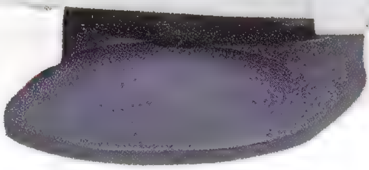
The SIMMs seem accessible, but since they're sunk in a pit between the slot daughtercard, quick power on control daughtercard, and CPU heat sink, look forward to frustration.



+	−
• GREAT MPEG SCALING AND PLAYBACK • FAST CD-ROM (FASTER THAN THE HARD DRIVE!)	• HORRIBLE SOUND SUPPORT FOR DOS GAMES • NO RESET BUTTON OR POWER OFF SWITCH • SLOW HARD DRIVE • HIDDEN MOTHERBOARD JUMPERS, AND HARD TO REACH SIMMS • WEAK BUNDLED MMX GAMES • PROPRIETARY CASE, INSIDE AND OUT

Balancing Act

The purple feet of the Aspire's minitower case can be rotated outward to enhance stability and the machine's "cuteness" factor. Unfortunately, there's no way to enhance the stability of the case's rounded top.



boot verdict

PRICE: $1,999 (+ $599 for monitor)
COMPANY: Acer America
PHONE: 800.733.2237
URL: www.acer.com/aac/

4

ViewSonic Professional Series PT775

Adjust this...

The ViewSonic PT775 is definitely a monitor for the pros—only a graphics pro would be able to make heads or tails of all the on-screen adjustments it provides!

The more adjustable a monitor is, the better your odds of getting a perfect picture out of it. Of course, if there are enough settings to adjust, it may take forever to reach that nirvana.

The PT775 has more on-screen adjustments to be made than we've ever seen before—you can even adjust the location of the on-screen adjustment window! You can tweak the usual: contrast, brightness, image size, screen position; and the unusual: pincushion, pin balance, trapezoid, parallel skewing, hourglass, hooking, tilt, horizontal and vertical convergence, focus, color purity, moiré removal, menu language, and color matching. Working with our favorite monitor test and adjustment tool, *DisplayMate*, you can spend hours fiddling with your display. Twenty-one user settings are preserved in memory, along with 11 factory presets.

In general, the PT775's visual quality is astounding. Colors are rich and bright, and beam convergence is flawless corner to corner, but we experienced a slight red gun focus problem in the very top right of the screen that no amount of adjusting could eliminate.

The moiré pattern adjustment worked well to remove most patterns from our evil test screens, but when it was enabled the few moiré patterns that remained pulsed. With moiré reduction turned off, some test screens were filled with horrendous patterns—a no-win situation. Better shielding might have helped. Fortunately, the kind of images that bring about these effects tend only to be found in display test utilities.

tech specs

Tube	17-inch SonicTron (16-inch viewable)
Grille Pitch	0.25mm
Max Res	1600x1200 at 77Hz
Horizontal Frequencies	30kHz to 96kHz
Vertical Frequencies	50Hz to 160Hz
Case Dimensions (HxWxD)	16.8x16.3x18 inches
Weight	46.2 pounds
Plug-n-Play	Yes; DDC Levels 1, 2B
Emissions	MPR-II, TCO
Power Management	VESA DPMS (130W, 80W, 15W, 8W)

Reflecting its professional stature, the PT775 provides both BNC (high-end) and D-sub (more typical) connections on the back. You can easily select the input to be displayed with a touch of the front panel buttons.

If you're serious about your screen and need absolute control of the image displayed, the ViewSonic PT775 is the monitor for you. It's a joy to look at even when pushing its highest resolution of 1600x1200, and it excels at 1280x1024. But be warned, this screen is overkill for all but the most hardcore display junkies. You can save hundreds if you can stand to live with a little less tweakability.

— Chris Dunphy

boot verdict

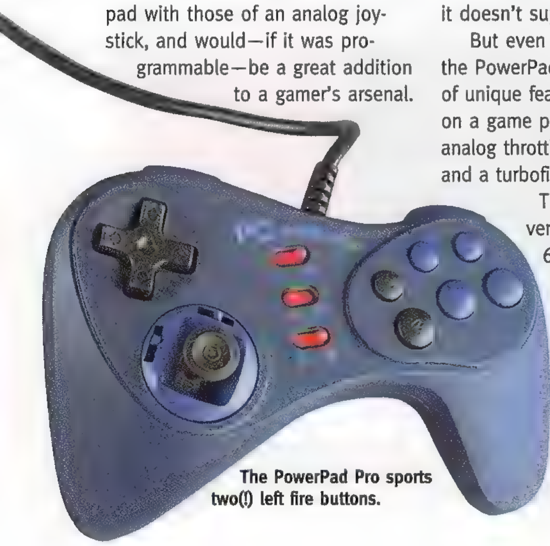
PRICE: $999
COMPANY: ViewSonic
PHONE: 800.888.8583
URL: www.viewsonic.com

8

PC PowerPad Pro

This 'aint no locomotive

The PC PowerPad Pro combines the best elements of a digital game pad with those of an analog joystick, and would—if it was programmable—be a great addition to a gamer's arsenal.



The PowerPad Pro sports two(!) left fire buttons.

Unfortunately, the PC PowerPad Pro isn't programmable, and worse yet, it doesn't support multiple players.

But even with those limitations, the PowerPad Pro still offers a bevy of unique features not usually found on a game pad: analog thumb stick, analog throttle control, trim controls, and a turbofire button.

The PowerPad Pro plays very much like a Nintendo 64 controller morphed with a Microsoft SideWinder. The pontoons rest comfortably in the palms of your hands, and all the buttons, including the three rear triggers, are easily accessible. The directional pad and thumb stick are equally convenient, but the meager thumb stick won't be sufficient for hardcore flight jockeys with ham-sized hands. The three red buttons in the middle of the pad let you quickly change from analog to digital operation, activate turbofire settings, or turn the throttle control on/off (useful in games such as *MechWarrior 2* or other flight/driving simulations). One warning however: You can't use the left and right fire buttons when the throttle control is active.

Surprisingly, the PowerPad Pro performs extremely well in *both* analog and digital modes. Directional control (including the oft-neglected diagonal) is precise, and the fire buttons all have excellent response and tactile feedback. The only real complaint is with the trim controls—they're extremely difficult to move, almost as if they were encased in cement. Luckily, you won't have to use them frequently (unless of course, you enjoy adjusting and fine-tuning the analog operation).

But in today's era of advanced game pads, the lack of programmability and absence of multiplayer support make this otherwise attractive game pad an ugly duckling. If you're looking for a standard offering, the PowerPad Pro is recommended, but advanced gamers would be advised to check out the programmable and multiplayer Gravis GamePad Pro or ThrustMaster Phazer Pad instead.

— Bryan Del Rizzo

boot verdict

PRICE: $29.95
COMPANY: InterAct
PHONE: 800.732.6866
URL: www.interact-acc.com

b

S/W

TRY IT ON THE DISC

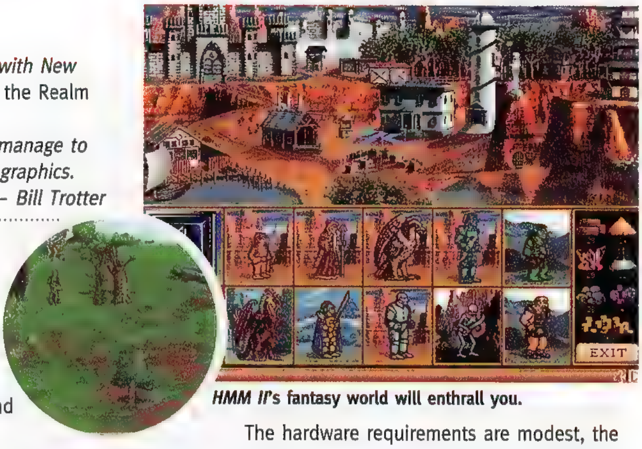
Heroes vs. Lords, Part Two

Don't make me smite thee!

Summon legions of dragons or make kings kneel before your righteous wrath with New World Computing's Heroes of Might and Magic II *and Sierra On-Line's* Lords of the Realm II*—the latest odes to mankind's second-favorite pastime.*

While these high tales of adventure may differ in plot and execution, both manage to capture the magical balance between in-depth gameplay and cleanly executed graphics.

— Bill Trotter



HMM II's fantasy world will enthrall you.

Heroes of Might and Magic II

Dragons and wizards and Orcs, oh my!

boot KICK ASS! PRODUCT

Simply stated, *Heroes of Might and Magic II* is a *great* strategy game: easy to learn, ferociously addictive, rich in color and nuance, exquisitely balanced in terms of both subtle strategy and cut-throat combat, and near-infinite in its replay value.

The setting is a fantasy world filled with monsters, magicians, and powerful artifacts. In either stand-alone battles or huge campaigns, you start by controlling a hero or two (along with a small army and either a castle or a village, which can be upgraded to a fortress over time).

You must send your heroes forth to explore the map, seize resources and treasure, and build up their powers through battlefield victories. Each scenario (or campaign level) has specific victory objectives, but the game gives you open-ended freedom to achieve those goals in many ways.

A brief synopsis, however, does no justice to *HMM II's* depth, texture, and capacity to give delight.

Blending 3D-rendered cut scenes alongside hand-drawn artwork (including all sprites and character portraits) *HMM II* mixes old-school visuals with new. Its blend of exploration, resource management, strategy, tactics, and spell casting—all served up in gorgeous 640x480 256 color graphics and supported by marvelous sound effects—is so utterly absorbing that you'll find yourself playing and replaying, oblivious to the passage of time. Turn-based combat and adventuring still take place via an overhead view of the terrain, but thanks to SVGA, the graphics are sharper than ever; and multiplayer mischief over TCP/IP, modem, or network, and the powerful scenario-editor result in almost limitless variety.

The hardware requirements are modest, the manual superb, and aside from a few negligible graphic glitches, we found no bug or crash during 50-plus hours of gameplay. And the campaigns (which are extremely challenging) are tied together with vivid narrative transitions that form a compelling story in their own right.

New World Computing has done everything right in this game. Buy it and fall under its spell.

boot verdict

PRICE: $59.95
DEVELOPER: PopTop Software
PUBLISHER: New World Computing
PHONE: 800.325.8898
URL: www.nwcomputing.com

9

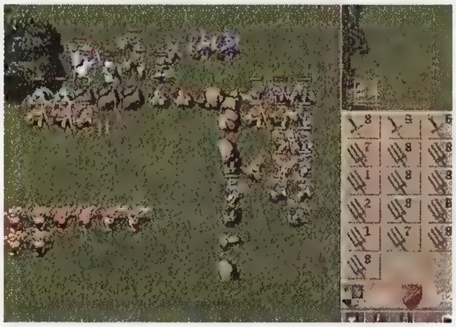
TRY IT ON THE DISC

Lords of the Realm II

Serfs up!

Here's a sequel that surpasses the (very fine) original by several orders of magnitude. No other strategy game succeeds as well as *Lords of the Realm II* in capturing the whole medieval ambiance, and few can rival it in overall design quality. It balances leisurely turn-based empire building with exciting real-time tactical combat, rendered in Impressions' colorful miniature-soldier style, and every single scene in the game is beautiful to behold.

Lords II sports several vantage points to observe your realm, from the three-quarters isometric view of your entire land, to the zoomed-in, *WarCraft*-esque tactical battle view. With its gorgeous 640x480 SVGA graphics, *Lords of the Realm II's* medieval landscape comes alive with sharply drawn sprites and a lush countryside that changes with the seasons.



Keep the inhabitants of your realm happy—your success is dependent on their contentment.

Your goal is to seize the throne of either a historical kingdom (England, Germany, Italy, etc.), or an abstract, fanciful one (spirals, checkerboards, archipelagos). Your base of power is a very convincing model of the medieval economy, and your source of military might is a large, contented population. Keep your peasants happy through reasonable taxes, ample food stock, gainful employment, and an occasional gift of ale, and you'll be able to build great castles and formidable armies.

Oppress your people, neglect to feed them properly, and you may face devastating peasant rebellions. Once you've built a solid infrastructure, you can move out and conquer neighboring provinces, which must then in turn be developed and protected. You can buy time by making (or breaking) alliances with your opponents, but eventually you'll have to master the techniques of siege warfare in order to triumph (or even survive!).

Sieges are spectacular: archers unleash clouds of arrows, infantry assaults from great creaking towers, and the defenders meet them with pots of boiling oil—great stuff! Each sprite has been meticulously modeled in *3D Studio Max*, as are all the cinematic cut scenes that populate the game.

Full multiplayer options add to the game's value, as do the excellent interface and solid AI. All in all, *Lords II* is a splendid gaming experience. It ravishes the eye even as it challenges the mind.

boot verdict

PRICE: $59.95
DEVELOPER: Impressions
PUBLISHER: Sierra
PHONE: 800.757.7707
URL: www.sierra.com

9

H/W

Hitachi **Mx-133T**

Déjà vu

Whenever bulky packages are delivered to the bootLab, the bootBoyz can be seen arm wrestling to determine who gets to review the new (and usually, cool) hardware. And with its 133MHz Pentium processor, 16MB of EDO DRAM, 256K Level 2 cache, 33.6Kbps modem, *and* built-in LAN port the Mx-133T notebook was no exception. But our initial jubilance was marred by mild pangs of anxiety—the Mx-133T looks remarkably like the WinBook FX (both share the same style case and ridge heat sink design) and we were concerned the Mx-133T would exhibit the same lousy performance. Thankfully, this wasn't the case. But still, the Mx-133T isn't perfect.

In all of our tests (except perhaps the Graphics WinMark, which doesn't provide much useful real-world information anyway) the Mx-133T's performance was consistently above average. Full-screen MPEG video playback is excellent, with only slight fuzziness around the edges. These successes are attributable mainly to the Zoomed Video and VESA 2.0-compliant Chips & Technologies 65550 video chipset and 2MB of integrated EDO VRAM, but credit also has to be given to the choice of premium mobile components: Both the Teac 8x CD-ROM and 1.4GB hard drive posted raging data transfer rates of 719K/sec and 826K/sec respectively. However, we ran into a problem running *Quake* at resolutions above 360x480—the screen turned a nice shade of blue and green—and at press time neither Hitachi nor Chips & Technologies could offer a work-around solution or a sound technical explanation (see sidebar).

The 12.1-inch LCD screen is bright and lucent, and with a maximum resolution of 800x600 at 64k colors it is adequate for most mobile users. The screen exhibits severe flex when the front panels are touched, but has a good off-axis field of view. And since the Mx-133T utilizes a ridge-style heat sink that forces the hot air to the right and up through the front panel, the right side of the LCD display becomes warmer the longer the notebook is left on—not an operating hazard by any means, but certainly a peculiarity.

The Mx-133T also comes equipped with an integrated U.S. Robotics 33.6Kbps modem, with connections for both a telephone and a cellular phone. Another nice touch is the built-in PCI-based 10BaseT LAN port for easy network access. The aforementioned CD-ROM drive and floppy drive are swappable, and although you can only use one at a time, you can swap both for an additional fixed hard drive or a second lithium-ion battery, ultimately boosting total battery power to more than four hours.

Despite the specialized Altec Lansing mini-stereo speakers, intelligently mounted on the left and right panels, the SoundBlaster Pro-compatible ESS1878 chip still sounds like crap. Why? 'Cause the ESS1878 is an FM-synth chip. It's time notebook manufacturers ditched this chip for a true wavetable audio solution. FM audio just plain sucks.

With excellent overall performance and superior communication capabilities, the Mx-133T is a solid choice. But if you're interested in mobile computing *and* gaming, the unresolved VESA 2.0 glitch and lack of a game port will leave you wanting more.

— *Bryan Del Rizzo*

under the hood

the brains

CPU	133MHz Intel Pentium
L2 Cache	256K
RAM	16MB EDO DRAM (80MB max)
Video	Chips & Technologies 65550 (2MB EDO VRAM)

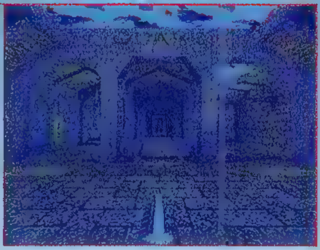
the brawn

Hard Drive	IBM 1.44GB
CD-ROM	Teac 8x
Expansion Bus	Two Type II cards or one Type III PCMCIA card
Lap Weight	7 pounds, 11 ounces
Carrying Weight	8 pounds, 14 ounces

the beauty

Display	12.1-inch active matrix
Sound	ESS Technology 1878 FM synth
Video	800x600, 16-bit color
Speakers	Altec Lansing stereo speakers, headphone jack
Communications	33.6Kbps modem, LAN port

Blue and Green and Really Mean



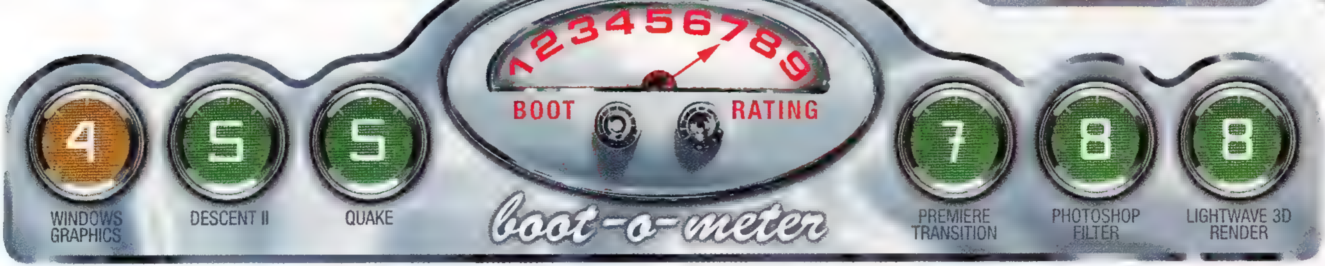
Occasionally, when you're testing hordes of computer equipment, you encounter a problem that no one before you has (for what it's worth, we're not sure why this keeps happening to the bootBoyz—must be all those Twinkies and Jolt cola). In any case, while testing *Quake* on the Mx-133T, we were surprised to see the screen turn a weird shade of blue and green whenever we cranked the game resolution beyond 360x480.

At press time, Hitachi still hadn't unearthed the solution. So, suspecting faulty VESA 2.0 compliance, we turned to the folks at Chips & Technologies, the manufacturers of the 65550 video chipset. Although they weren't able to offer a concrete solution, they did mention that the problem may reside in the VESA 2.0 specification itself. According to engineers at C&T, a 09h function call—Set/Get Palette Data—may have been written incorrectly to set up the color palette. If the game or hardware uses a 09h function call but isn't calling the colors in the proper sequence (such as BGR instead of RGB) the screen appears colorfully screwed up. C&T also stated that this anomaly is being fixed in VESA version 3.0.

Brick Shot

Weighing in at only 12 ounces, the Mx-133T's power brick sports a relatively low-profile design. Too bad there's no way to integrate it into the case.

ADVANTA
VISA



A complete breakdown of benchmark results is available on the *bootNet*. Point your browser to www.bootnet.com

real-world battery life

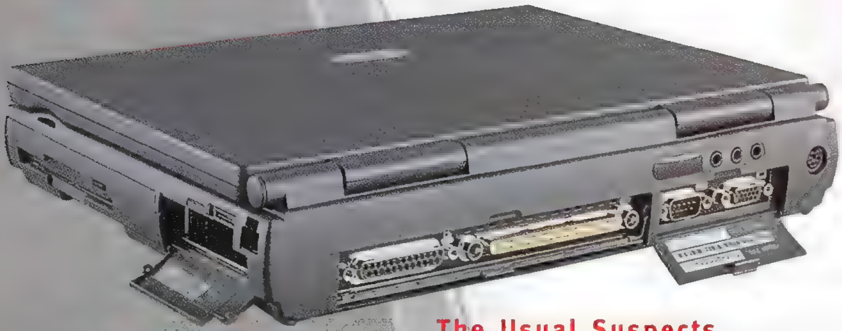
02: 02:00

the bundle

Laplink '95 • Netscape Navigator 3.0 • Norton AntiVirus

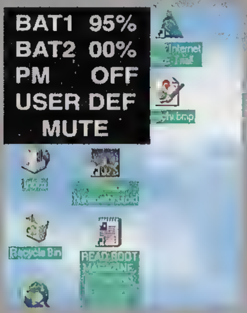
the goods

The Mx-133T is a solid performer, even with the quirky VESA 2.0 bug. Pricing is higher than for similarly equipped PCs, but they wouldn't include a LAN port.



The Usual Suspects

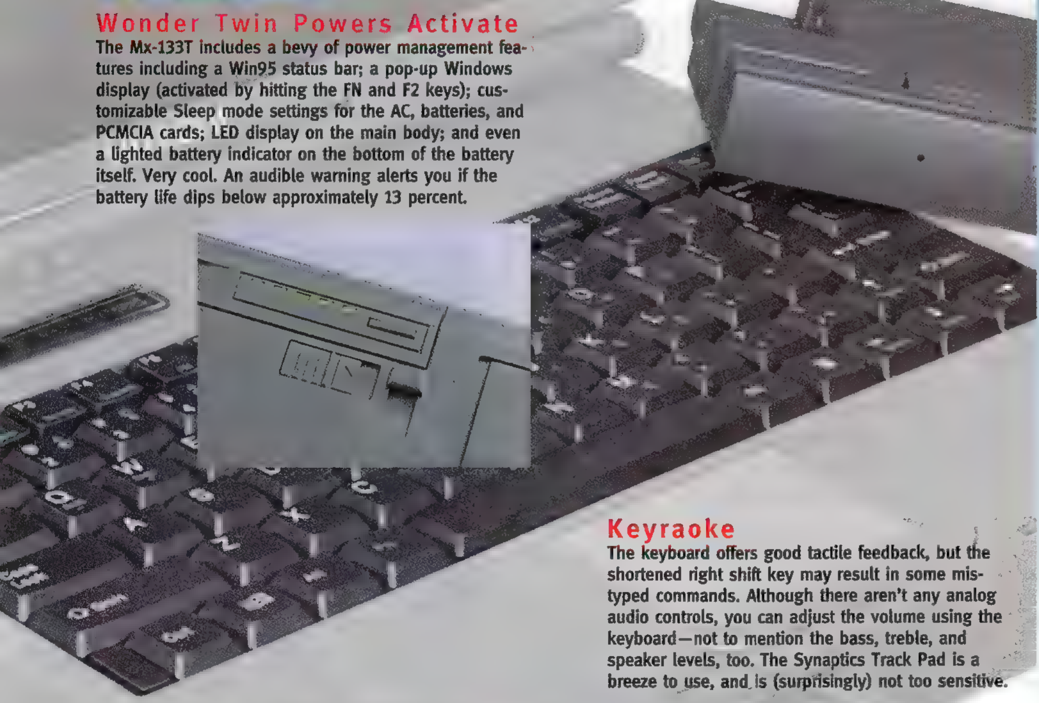
The rear of the Mx-133T is adorned with parallel, docking station, serial, external monitor, and external PS/2 keyboard/mouse ports. There's also an IrDA-compliant module, external microphone jack, audio line-in jack, and external speaker jack. The LAN port is located next to the hard drive and power jack, while the phone jack is located up and to the right of the PCMCIA sockets, which by the way, support up to two Type II cards or one Type III PCMCIA card. One negative: Removing the CD-ROM drive is a total pain.



BAT1 95%
BAT2 00%
PM OFF
USER DEF
MUTE

Wonder Twin Powers Activate

The Mx-133T includes a bevy of power management features including a Win95 status bar; a pop-up Windows display (activated by hitting the FN and F2 keys); customizable Sleep mode settings for the AC, batteries, and PCMCIA cards; LED display on the main body; and even a lighted battery indicator on the bottom of the battery itself. Very cool. An audible warning alerts you if the battery life dips below approximately 13 percent.



Keyraoke

The keyboard offers good tactile feedback, but the shortened right shift key may result in some mistyped commands. Although there aren't any analog audio controls, you can adjust the volume using the keyboard—not to mention the bass, treble, and speaker levels, too. The Synaptics Track Pad is a breeze to use, and is (surprisingly) not too sensitive.

Caveat Emptor

It's really annoying to get a new product, only to find some of the promised components inexplicably MIA. Hitachi's marketing materials, manual, and corporate web site contain information that is inconsistent with the actual shipping hardware we received. For example, the operating manual mentions a MIDI/game port, but *our* machine didn't have one. Hitachi says the game port was previously included, but was pulled due to customer disinterest. Yeah, sure.

Another example is the product information sheet. It indicates the inclusion of an ESS1878 hardware wavetable 3D sound chip even though our notebook only included the FM-based version. Perplexed, we tried calling Hitachi's technical support team, but they didn't even understand the fundamentals of wavetable vs. FM, and thought we were talking about playing WAV files.

We also tried calling ESS Technology's head office, but were greeted by a rude receptionist who threw us into a prerecorded voice-mail hell. When we were *finally* able to speak to an ESS engineer, we were informed that the ESS1878 chip is FM only and not wavetable (as Hitachi would have you believe). As for that 3D sound, forget it. It doesn't exist.

And regardless of what the product sheet states, the floppy drive *isn't* hot swappable.

If you had purchased the Mx-133T based on this information, you'd be mighty miffed. But although Hitachi agrees that their product information is incorrect, they were also quick to point out the tiny print at the bottom of the page that says "Product specifications are subject to change without notice." Consider yourself warned.

+	–
•Zoomed video port •Built-in 33.6Kbps modem •Built-in LAN port •Excellent full-screen MPEG playback •Good power management features	•Buggy VESA 2.0 compliance •No game port •FM audio •CD-ROM drive difficult to remove

boot verdict

PRICE: $4,299
COMPANY: Hitachi
PHONE: 800.555.6820
URL: www.hitachipc.com

7

H/W

Packard Bell Platinum 2240

Don't peak inside!

Packard Bell designs computers that look good on paper. If you were comparison shopping at your local mega-mart, a Packard Bell machine would always lead the bang-per-buck pack by yards. What's more, with their color-coded setup, huge pre-loaded software bundle, and "walking around a virtual house" user interface Packard Bell computers seem like something even grandma could use.

In the past, however, you always "got what you paid for" with Packard Bell so it was a pleasant surprise to find that even though the MMX-powered Platinum 2240 still suffers serious design flaws, it delivers impressively in many ways.

The funky case is the first thing you notice about the 2240. The squat pedestal isn't just for looks, it hides the custom motherboard lying flat across the bottom. Inside the case you'll find a tangle of wires and inaccessible jumpers that make upgrading a nightmare. Compare this mess to the clean ATX-standard motherboard in the Sony VAIO, and you'll wonder why some manufacturers still insist on using proprietary motherboard designs.

Packard Bell's choice of the stock S3 ViRGE chip for a machine that claims future support for DVD is puzzling. Though the ViRGE *does* deliver good Windows benchmark numbers, it lacks vertical interpolation in its video scaler resulting in very grainy and jagged full-screen MPEG video playback. DVD video will look bad playing on this machine. The ViRGE also lacks built-in VESA 2.0 support (very important for DOS games) and its 3D acceleration capabilities are hardly worth mentioning. Also, like most motherboard-mounted graphics chips there are no sockets to expand to 4MB of video RAM to support higher resolutions. Fortunately, the onboard graphics automatically disable themselves when you plug in a more capable card.

The companion monitor to the PB Platinum line is the 17-inch 3025, which delivers a surprisingly good picture as long as you don't try to push it to 1280x1024. The computer comes bundled with a pair of speakers that can be screwed flush to the side of this screen. When the speakers are cranked they cause a touch of display distortion, but surprisingly, have very little distortion of their own, delivering excellent sound. However, the lack of a subwoofer is painfully apparent. Still, the speakers are more impressive than those built into Sony's flashy multimedia monitor. Also surprising is that the 3D sound enhancement circuit actually works remarkably well, adding hiss but increasing the apparent sound stage dramatically. The Aztech Audio III sound/modem card delivers SoundBlaster Pro compatibility and software wavetable sound with an 8MB sample file that sounds refreshingly good.

The rest of the system's components offer first rate performance. We measured very respectable HD speeds and the 16x maximum speed CD-ROM was off our charts. It seems as if Packard Bell is working hard on becoming a performance, not just a price, leader. If you can handle the funky case, and even if such a tweaker-unfriendly machine is not your cup of tea, it's a great starter system for grandma.

— *Chris Dunphy*

under the hood

the brains

CPU	200MHz Intel Pentium with MMX
L2 Cache	256K pipeline burst
RAM	32MB EDO DRAM (128MB max)
Video	S3 ViRGE with 2MB EDO DRAM

the brawn

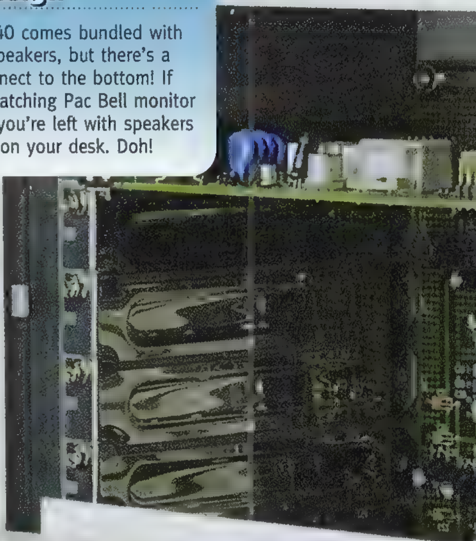
Hard Drive	3.2GB Quantum Fireball TM3200
CD-ROM	16x Max, Goldstar CRD-8160B IDE-ATAPI
Expansion Bus	Three PCI slots (all open, one shared); three ISA slots (one taken, one shared)
Fax/Modem	Aztech Labs Sound III 336SP (33.6Kbps data) works as a full-duplex speakerphone, does not do DSVD

the beauty

Monitor	Packard Bell 3025 17-inch monitor (15.9-inch viewable, 0.28mm dot pitch)
Sound	Aztech Labs Sound III 336SP (FM-synth and software wavetable with 8MB sample file); SRS 3D Amphitheater Stereo Sound, BBE High Definition Sound Enhancement
Speakers	Packard Bell Integrated Speakers (no subwoofer)
Other	Two USB ports; MediaSelect remote control station

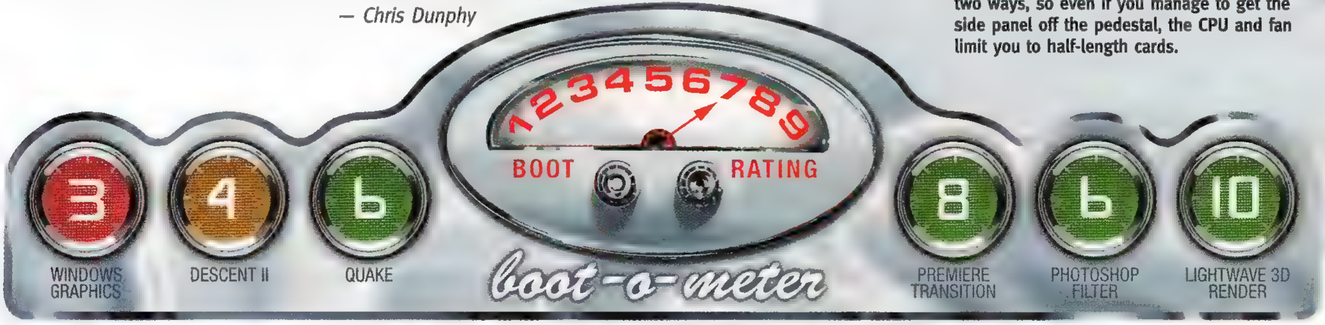
Unsound Design

The Packard Bell 2240 comes bundled with a very nice pair of speakers, but there's a catch: The wires connect to the bottom! If you don't buy the matching Pac Bell monitor to screw them into, you're left with speakers that won't stand up on your desk. Doh!

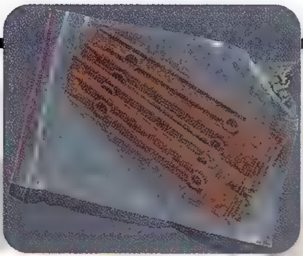


Thwarted!

The bottom shared PCI/ISA slot is blocked in two ways, so even if you manage to get the side panel off the pedestal, the CPU and fan limit you to half-length cards.



A complete breakdown of benchmark results is available on the *bootNet*. Point your browser to www.bootnet.com



Mixed Signals

Everything about the Platinum 2240 says "Don't upgrade me!" No empty SIMM slots, no cabling for extra drives, etc. The case even comes sealed shut with a QA sticker. Why then did Packard Bell include HD mounting rails? A nice touch that leaves us scratching our heads...

the bundle

PB Navigator • MS Works • MS Word • MS Money • Quicken SE • Reuters Money Network • Tuneland • Dinosaur in the Garden • The Little Engine • Sonic the Hedgehog • MS Entertainment Pack • Sony Interactive Music Sampler • Ecco the Dolphin • Comix Zone • SimCity Classic • The Third Dimension (MMX) • Pod (MMX) • The Ultimate Human Body (MMX) • PrintMaster Gold • Janna Contact Lite • MS Encarta 96 • Student Reference Library • Encyclopedia Britannica Online • ETV Host • VoiceView TalkShop • ComCentral • Planet Oasis • MyWay • Internet Phone • MGI PhotoSuite • Paintshop Pro Shareware 3.12

the goods

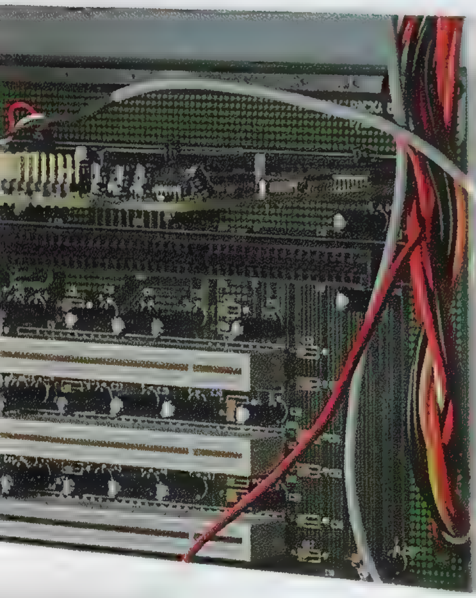
The Platinum 2240's pedestal base isn't just for looks—it houses the motherboard, in what is certainly one of the most bizarre case designs we've ever seen. The good performance and quality components help save this machine's bacon from being fried.

Redecorate this House

The Packard Bell Navigator might prove to be an easy way for newbies to get around, but power users will quickly grow frustrated by the cheesy interface that doesn't cope well with desktops set larger than 800x600.

It's a Jungle in There

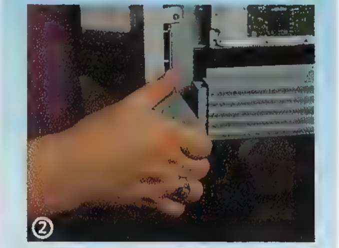
To reach the SIMM sockets you'll have to fight your way through a tangle of drive cables. Fortunately, Packard Bell left no free SIMM slots to tempt you into an upgrading adventure. The IDE drive cables also have no connector for adding slave drives, if you want a second HD, you'll have to replace the provided cable.



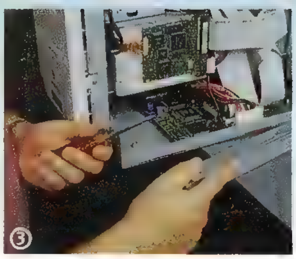
Chin Up

The main case comes off easily enough with just three simple screws, but getting at the bottom slot, SIMMs, or motherboard jumpers requires taking off the pedestal edges—a difficult procedure (which is poorly documented) requiring both hands and your chin.

①



②



③

Packard Bell

One Click and...

The MediaSelect remote control sits conveniently under your monitor and gives you easy one-button access to the bundled media and communications apps.

+	−
•LOTS OF BANG FOR THE BUCK •HUGE SOFTWARE BUNDLE FEATURING THE FULL MS WORD •SURPRISINGLY GOOD BUNDLED SPEAKERS •A RESET BUTTON!	•NO FREE SIMM SLOTS •INSANE CASE DESIGN •S3 VIRGE GRAPHICS CHIP •POOR VIDEO SCALING

boot verdict

PRICE: $2,699 with monitor, $2,199 without
COMPANY: Packard Bell
PHONE: 800.733.5858
URL: www.packardbell.com

H/W

EagleMax Joystick

Program-a-rama

Although only a handful of games actually support the EagleMax directly, it's also compatible with the ThrustMaster Flight Control System.

The EagleMax bears some resemblance to Microsoft's SideWinder joystick—both utilize a similar industrial design—but this 'aint no cheap cubic zirconia impostor. This is a well-crafted, well-designed flight stick, incorporating many unique features that'll be of interest to both casual gamers and flight fanatics.

Compared to behemoth offerings from ThrustMaster and CH Products, the EagleMax sports a relatively low-profile design. The handle is coated with a special textured rubber and, thanks to the wrist rest, is extremely comfortable—even for long flights. The grip is solid and well-constructed, but unless you're wearing thick winter gloves, you'll find the sharp ridges of the throttle control uncomfortable.

Installation is a snap. Like other programmable joysticks, the EagleMax utilizes both a game port and keyboard AT-style and PS/2-style pass-through connector for programmability. DirectInput drivers are included, and under either Win95 or DOS, the EagleMax can be configured as a two-axis, four-button joystick, four-button flight yoke with throttle, or even a ThrustMaster Flight Control System. Functionality, programmability, and overall performance however, depend on the configuration mode selected. Unfortunately, the operating manual needs an overhaul, too—the programming information is spotty at best.

Now for the good stuff. The EagleMax contains a bevy of buttons: five on the handle (including a trigger and four-way hatswitch), eight on the main base, and two more on a rocker switch. Trim controls, a throttle wheel, auto-fire toggle switch, and programming controls are all located on the raised platform. Although only a single keystroke can be mapped to the buttons on the handle itself, up to 10 keyboard commands can be mapped to any of the other buttons, including the rocker.

A Win95 programming interface is included, but programming the buttons in DOS is more intuitive and much more fun. And, unlike other programmable joysticks that can store only one game setting at a time, the EagleMax can store up to four (you can easily change settings by toggling the Macro button). And if you're not happy with the current control settings, you can even change them on the fly.

The EagleMax handled great in games such as *U.S. Navy Fighters* and *Jetfighter III*, but the lightweight base resulted in severe lift in fast-action games such as *MechWarrior 2* and *Descent 2*.

Minor quibbles aside, the EagleMax is enthusiastically recommended.

— *Bryan Del Rizzo*

boot verdict

PRICE: $59.95
COMPANY: ACT Laboratory
PHONE: 800.980.9997
URL: www.actlab.com/gamegear

9

World Talk & NetMeeting v2.0b2

One of these is not like the other

The Interact World Talk Internet phone is a waste of plastic (and batteries). It's nothing more than a cheap speaker and microphone housed in an uncomfortable telephone form. On the other hand, the bundled *NetMeeting* software by Microsoft is a fine program, but in no way do these two products need each other to work.

Don't be fooled by its appearance: The World Talk is *not* a telephone. This may not be readily apparent, as the hardware comes with no instructions. First, you'll have to pass your speakers through the World Talk, since it takes up the speaker and mic jacks on your sound card. And don't try to simply hang up the phone when you're done with a call. A feedback squeal will remind you that there's a button to turn the phone on and off. On my first call, I could hear the other party, but they couldn't hear me. That's because the World Talk's microphone requires two AA batteries (not included, of course), which is more than a little odd, since most PC microphones don't require batteries.

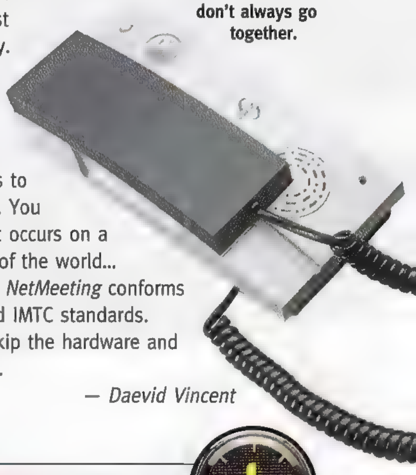
Our first (successful) test call was placed between the *boot* office's T1 line and a 28.8Kbps modem in a nearby city. The sound was jerky, but coherent for the most part. Certainly no substitute for a real phone, but then again... it's free! Any dialogue we couldn't make out, we just typed into *NetMeeting*'s chat window. Next we tried a T1-to-T1 cross-country call. This time sound quality was equal to a typical telephone call, and with a full duplex sound card, it's seamless.

In contrast, the *NetMeeting* software is snazzy, especially compared to other Internet phone programs, such as *CoolTalk* and *DigiPhone*. Unfortunately, you *must* install *Internet Explorer v3.0* as part of the installation process, regardless of whether or not you already have it installed. World Talk ships with v1.0 of the software, but v2.0b2 is available free from Microsoft. Skip the CD-ROM and just download this version straight away.

NetMeeting has features galore, including call logging, chat saving, and e-mail for people who don't answer the phone. Beyond cool is the ability for non-MIS types to share programs over the telephone. You can see and control the action as it occurs on a friend's machine on the other side of the world... with no long distance charges! And *NetMeeting* conforms to many of the LDAP, ITU, IETF, and IMTC standards.

When it comes to World Talk, skip the hardware and just download the software for free.

— *Daevid Vincent*



Comfort and looks don't always go together.

boot verdict

PRODUCT: World Talk
PRICE: $47.99
COMPANY: InterAct
PHONE: 800.732.6866
URL: www.interact-acc.com

1

boot verdict

PRODUCT: NetMeeting
PRICE: free download
COMPANY: Microsoft
PHONE: 800.426.9400
URL: www.microsoft.com/netmeeting

8

Adobe Photoshop 4.0

Less than a new house; more than a new coat of paint

That old workhorse *Photoshop* has a snazzy new interface design, is streamlined, and has refined the features that made it so popular, but this ain't no elaborate cosmetic surgery. It's more like a quick nip and tuck.

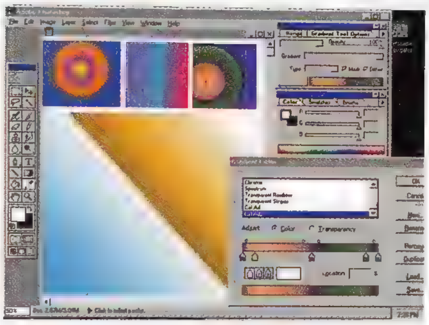
You won't find *Photoshop 4.0* bursting with fabulous new menu items akin to 3.0's layers innovations. However, 4.0 does have some tricks up its sleeve. Batch processing (a.k.a. the Actions palette), for wrestling with scores of unprocessed images, doubles—with the click of a button—as the Commands palette found in 3.0; a new layers addition, the Adjustment layer, allows you to peruse color and tone corrections before committing to image changes; the Free Transform tool is a welcome addition to the Scale function, giving you greater flexibility in fewer steps; and at last, "snap to" guides! 4.0 has non-printing guides you can drag out from the Rulers to align visual elements.

With the addition of 48 new effects filters, *Photoshop 4.0* now boasts more than 90 filters. The new offerings (originally part of Adobe's *Gallery Effects* package) range from colored pencil to crosshatch to film grain. And all the filters are now 32-bit native, for faster processing.

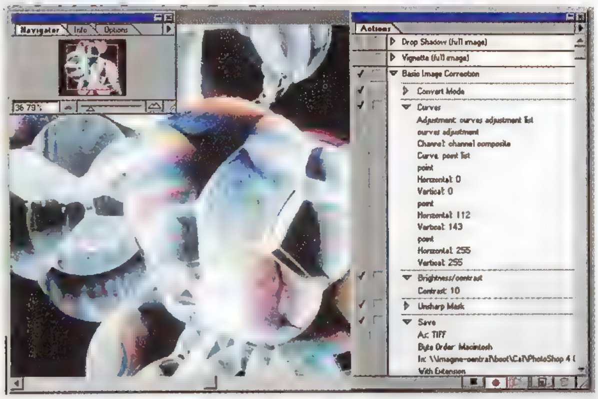
Speaking of faster processing, 4.0's MMX plug-in takes full advantage of Intel's new instruction set to cut processing times in half for most commands. And new support for symmetric multiprocessing on machines with multiple processors will keep owners of the Tyan Tomcat smiling as even the most demanding Gaussian blur flies by.

If you're at home with 3.0, a little re-orientation is required. Some keyboard shortcuts have changed and the new Tools palette design includes the Pen tool (previously located in the Paths palette). If this is Adobe's attempt to reduce the number of windows on the screen, it's welcome—space is essential when using multiple palettes—but it's still no help if you have a 15-inch monitor.

The new Navigator viewing window is extremely useful for zooming in on specific details for correction. A viewfinder monitors your position on the image and a slider at the bottom of the window allows you to change magnification from 49.99 percent through 1,600 percent. Very handy!



A new Gradient editor offers enhanced features.

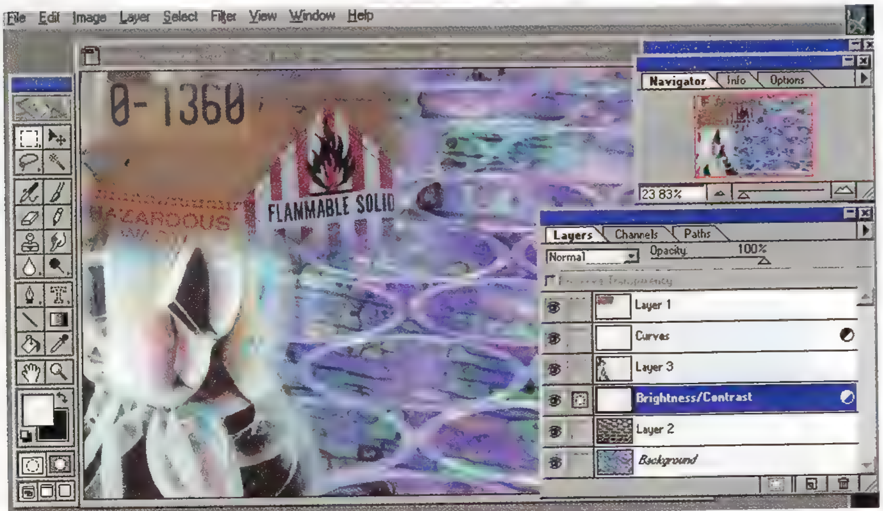


Drop Shadow (full image)
Vignette (full image)
Basic Image Correction
Convert Mode
Curves
Adjustment: curves adjustment list
curves adjustment
Channel: channel composite
Curve: point list
point
Horizontal: 0
Vertical: 0
point
Horizontal: 112
Vertical: 143
point
Horizontal: 255
Vertical: 255
Brightness/contrast
Contrast: 10
Unsharp Mask
Save
As: TIFF
Byte Order: Macintosh
In: \\imagine-central\boot\Cal\PhotoShop 4 (
With Extension

Batch processing is a breeze with *Photoshop 4.0*'s new and fabulous Actions palette. Configure your batch steps and watch it go.

The enhanced Gradient tool now comes with an awesome editor allowing you to fine-tune color gradients. The Gradient bar can comfortably handle up to 25 colors—more colors than any one gradient has any right to use, but it's great to have the power.

To top it off, *Photoshop* 4.0 is web friendly—this rocks. Images downloaded as GIFs and JPGs are fully recognizable and batch processing these babies is a breeze. 4.0's technology enables you to select an origin folder (using the Actions palette), which may contain GIFs, JPGs, *Word* files, even other folders. 4.0 only processes the images and skips the rest. No need for housekeeping before processing.



The Layers palette now includes an Adjustment layer. This new layer supports tone and color corrections, which can be viewed in context before permanent image changes are made.

And, when it comes time to create web graphics, 4.0 can export GIF89a and PNG formats. It also comes standard with JPEG options such as image quality and format choices. GIF options include normal and interlaced.

Photoshop still has a voracious hunger for memory, with this new version requiring even more minimum RAM than version 3.0. Don't even think about launching 4.0 with less than 16MB free RAM—and 32MB is a comfortable amount, as long as you keep image size down. Also, prepare to keep at least 25MB of hard drive space free—although the rule of thumb has always been to be ready with free hard drive space roughly three times the size of the file you're working on. When working on a 40MB full page image for print reproduction, you'll want at least 120MB free.

Photoshop 4.0 is a top-quality application that sets the pace for all graphics software. For those new to *Photoshop*, exploring the program is exciting and rewarding; while hardcore users now have a streamlined, batch processing, web-friendly upgrade to look forward to.

— Cal Joy

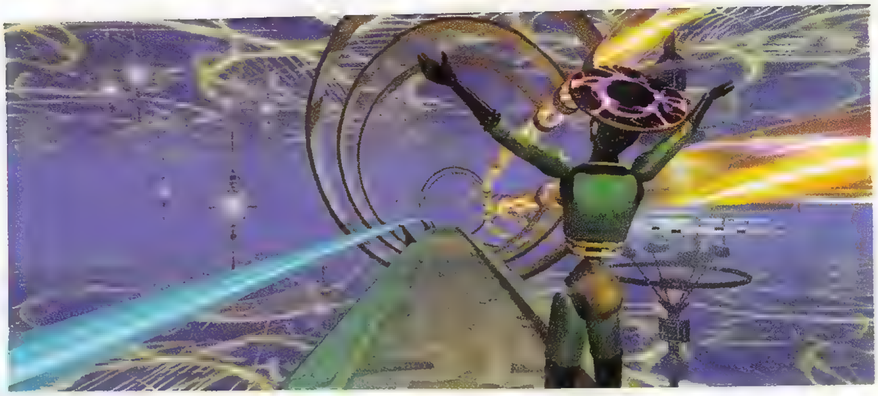
boot verdict

PRICE: $895
DEVELOPER: Adobe Systems
PUBLISHER: Adobe Systems
PHONE: 800.492.3623
URL: www.adobe.com

9

Obsidian

Sleeper of the year



***Obsidian* is a visual delight—game settings are vibrant and artistically creative.**

OK, I confess. I've never actually played *Myst*. Some would say this handicaps me in reviewing *Obsidian*, a game heralded as the next *Myst*. Regardless, this much I do know: From a technical perspective, *Obsidian* is damned impressive. Unfortunately, it's just not much fun to play.

Set in the year 2066, *Obsidian* concerns itself with two engineers who are sucked into a black rock formation, aptly named after the volcanic glass. Once inside, the surreal landscapes are culled from your real-world dreams and nightmares. You'll have to intimately explore the new surroundings, solving puzzles to find your way out.

These giant mechanical arachnids are manifestations of your disturbing dreams.

Obsidian was developed with *mTropolis*, which displays the *SoftImage*-rendered 640x480 still images. mToon, a proprietary sprite format, generates the sophisticated animations, and QuickTime movies make up the majority of motions and puzzles. Since the story takes place in a twisted alternative reality, SegaSoft has created a slew of visually stunning, extremely innovative—and in some cases, just plain weird—game environments. The Bureau, the very first room you'll encounter, is a dizzyingly effective and detailed environment defying conceptual physics. More than 100,000 polygons, 10,000 frames, and six camera angles meld together allowing you to walk on the walls and ceilings. In *Obsidian*, expect the unexpected.

With such stunning visuals, how can the gameplay be so boring? The story—used primarily for background fodder—isn't captivating, and although the surreal landscapes are pretty, interaction is severely limited. You can't touch the majority of the items you see, and the puzzles, although not excessively difficult, aren't at all intuitive. Hell, if the manual hadn't included hints for the entire first section, I would've quit before the second leg of this dog-slow journey.

I also expected more from Thomas Dolby and Headspace, who combined to create the music and sound effects. The subdued New Age soundtrack just didn't fit the tone of the game. Something more punchy would've helped keep me awake through the slow gameplay.

For a game that looks so great, *Obsidian* is quite the bore. — *Bryan Del Rizzo*

boot verdict

PRICE: $49.95
DEVELOPER: Rocket Science
PUBLISHER: SegaSoft
PHONE: 888.734.2763
URL: www.segasoft.com

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STB Systems	16	307	www.stb.com
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boot

WebEdit Pro 2.0

Weaving your web site the easy way

No HTML editor yet has eliminated the need to understand the layout language's basic syntax, but Luckman Interactive's *WebEdit Pro* makes web publishing just about as easy as possible.

This well-designed program makes the most common tasks almost trivial. Creating a basic home page with the usual stuff on it (title, images, links) is a no-brainer with the Home Page Wizard, and setting up frames, forms and tables is also a cinch. Client-side image mapping is a joy, just drag out a region of your image, assign it a URL and you're done. The built-in previewer, while certainly useful, is incapable of displaying anything beyond HTML 2.0. Since the program is otherwise entirely compatible with the latest web media-type specifications, including HTML 3.2 and JavaScript, it's strange that even *Navigator 2.0* is more current with regard to HTML (it does 3.0). In any case, it's easy enough to preview your work in your favorite browser; just click on a toolbar button.

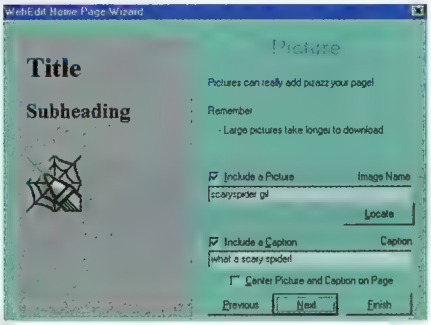
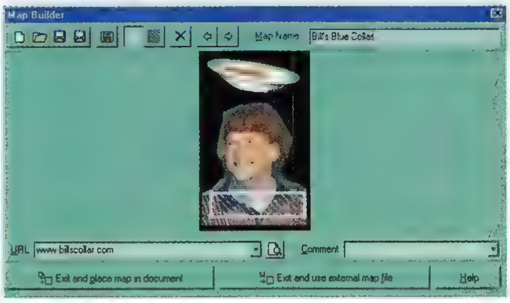


Image Name: scaryspider gif

Caption: what a scary spider!

The Home Page Wizard provides near-instant gratification, although the options are fairly minimal.

More importantly, the standard headaches caused by WYSIWYG HTML editors don't occur with *WebEdit Pro*. The program's highly configurable tools allow you to control how carriage returns are inserted on a per-tag basis, add your own tags, include only your favorite tags in the toolbar, and set colors for tags and HTML document text to your liking, just to name a few. All this both assists in learning HTML (since the generated code is more readable) and significantly speeding up HTML authoring, even for the expert.


Map Builder
Map Name
Comment
Exit and place map in document
Exit and use external map file
Help

Map Name: Bill's Blue Collar

URL: www.billscollar.com

The Map Builder is entirely too easy; just drag a rectangle around the area you want to link and enter the URL; *WebEdit Pro* generates all the coordinate values for you.

The tutorial-style documentation and omnipresent context-sensitive help are truly brilliant, and the Tag Checker feature leaves you no reason to wonder whether your documents will work with whatever browsers you want to support. If you group your files into a project and tell *WebEdit Pro* where your server is, it'll even take care of uploading everything for you.

WebEdit Pro is all about making life simpler for the web author, and it'd be a bargain at twice the price.

— Neil Redding

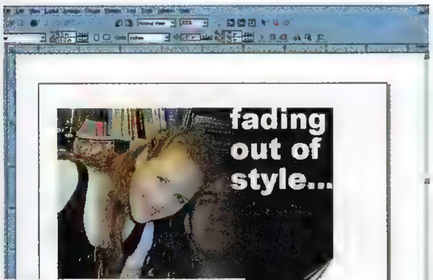
boot verdict

PRICE: $59.95
DEVELOPER: Luckman Interactive
PUBLISHER: Luckman Interactive
PHONE: 800.711.2676
URL: www.luckman.com

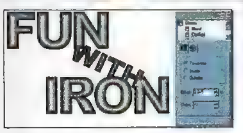
8

Corel**Draw** 7

A low-price megastore of tricks and menus



Interactive Transparency tool: good. Page Curl plug-in: bad.



Use the Welding and Contouring tools for a wrought-iron look.

OK, so *CorelDraw* isn't the *hippest* of illustration programs. "Real" graphic designers have been dissing it for years: It lacks precision. Its special effects are cheesy and easily abused. Its color management is atrocious. No pre-press house will work with it. It's the WalMart of design suites, with too many cheap program modules under one roof when it *should* be concentrating on a single killer app. Such are the complaints of the designer elite. Hell, it's even Canadian.

But when's the last time you tried to master an elaborate effect in Adobe *Illustrator*? *CorelDraw 7* is an incredibly easy-to-use vector-raster hybrid. While its 3D and image editing programs can't even begin to compete with *3D Studio Max* or Adobe *Photoshop*, its core drawing app is packed with more precision than a Swiss diamond cutter, and more menu items than you could digest in a year's worth of intensive use. Yes, its Effects palettes encourage gaudy design, but it's up to you, friend, to show restraint.

As an update, version 7 offers more subtle engine and interface improvements than wholly new features. You get faster performance for a number of time-intensive events, and a few newly streamlined menus and toolboxes. On the sexier side, fills, blends, and transparencies can now be added with a single sweep of an interactive tool; extrusions can now include beveled edges; and bitmap effects (including some packed-in *Photoshop*-compatible plug-ins) can be added without exiting *CorelDraw* and going into *Photo-Paint*. You also get *WordPerfect*'s spell checker, grammar checker, and thesaurus; support of Adobe Type Manager 4 and TrueDoc; and support for Kodak's ColorSync 2.0 color management system and the Pantone hexachrome palette.

Surprisingly, the *CorelDraw 7* sprawl doesn't include good Internet features. Sure, it exports JPG, GIF89a, and even PNG formats; and, yes, you can build image maps, but the suite doesn't include an HTML editor, or a GIF animation assembler. This is probably Corel's way to get you to buy their *Web.Graphics*, an illustration suite that includes all the standard web creation apps, plus some core *CorelDraw* features.

Despite insufficient Internet support, *CorelDraw 7* is a great value. Don't let the art snobs tell you otherwise.

— Jon Phillips

boot verdict

PRICE: $595
DEVELOPER: Corel
PUBLISHER: Corel
PHONE: 800.772.6735
URL: www.corel.com

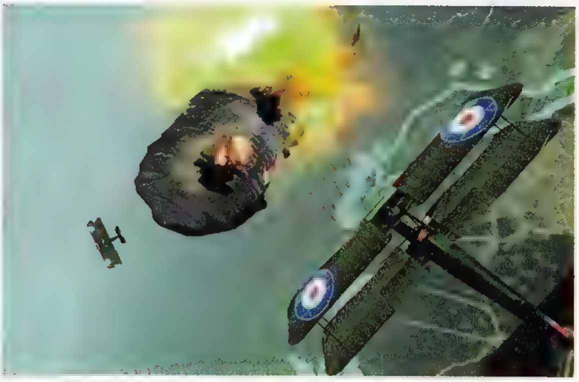
8

S/W

TRY IT ON THE DISC

Flying Corps

Try your hand at flying a real Fokker



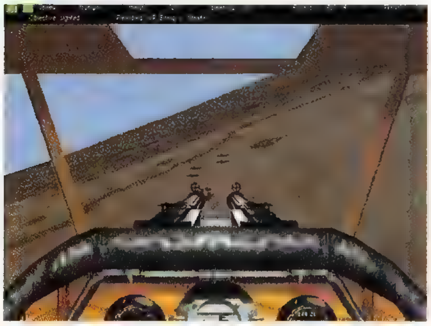
Balloon-busting produces very dramatic results—you can even see the crew bail out as your plane bores in for the kill.

Look—I *know* we're supposed to give a firm verdict on products, but sometimes that's just impossible. *Flying Corps* is such a melange of virtues and vices that it defies clear-cut verdicts.

First things first: *Flying Corps* is a detailed and admirably authentic simulation of aerial combat in the last two years of World War I. There are a handful of stand-alone missions, but the meat of the game lies in the campaigns, which permit you to join a squadron (German, American, or British), and fly missions until you either die or triumph.

What's good?

The SVGA graphics are gorgeous. Not only are the texture-mapped polygon planes, cloud cover, and atmospheric effects exquisitely rendered, but the texture-mapped contoured ground scenery is the best ever in a WWI sim. The first time you go on a strafing attack and observe a battle-in-progress—complete with infantry, tanks, shell bursts, and ack-ack guns—you'll probably do a Tex Avery-esque eye-popping take. Graphic resolutions, from the standard 320x200 to a ball-busting 1024x768, trading graphics for frame rate.



Ground attack missions in *Flying Corps* feature remarkable detail and texture.

The flight models are immaculate. With all the realism options turned on (torque, wind, slipstream, blackouts, bomb drag, the works) these virtual planes are every bit as cranky, dangerous, and demanding as their real-life counterparts—which translates into enormous satisfaction when you finally master them.

The presentation is superb. *Flying Corps* comes with a packet of sturdy maps replicating the ones actually used by WWI pilots, and a facsimile of a real 1918 pilot's manual—a generous extra that's nearly worth the price of the game.

You can customize your planes' paint-jobs—with 32,768 options, no less!

What's not-so-good about *Flying Corps*?

The interface, for one. Some of the keyboard commands are bizarre. To drop bombs, for instance, you don't press "b." Instead, you hit "number pad enter." And the command menu contains the following regarding engine power: "100 percent rpm... press 10"; followed, one line down, by: "100 percent rpm... full stop." ("Full stop" being the English term for what we Americans call a period.)

The padlock views are hopelessly disorienting, until you've logged many hours with them. I had to re-fly my first mission against an enemy aerodrome *five* times before I even saw the target, despite all the on-screen arrows. The publisher is aware of this problem and is offering a free patch with less confusing views.

And then there are the *steep* hardware requirements. With all the graphic options turned on in resolutions as low as 640x480, the frame rate becomes so choppy that even P200 MMX system owners will have to compromise, adjusting graphics resolutions, pixel size, and antialiasing. Use of Direct3D hardware acceleration could have easily alleviated this problem.

The lack of a custom mission builder is a *big* omission!

Campaigns are given context by some fine-looking 3D-rendered cut scenes, but there's no interactivity to speak of with your comrades. Call me old-fashioned, but there were times when I longed for the cheesy, over-the-top melodrama of the *Wings of Glory* plot.

Also, multiplayer didn't make it in time for the first version of *Flying Corps*—Empire promises a free update on their web site, hopefully by the time you read this.

All up, *Flying Corps* has great graphics and realism mixed with a lot of eccentric and frustrating design choices. I loved it and I hated it. Buy it or wait for *Red Baron II*. Either way, you can't go wrong.

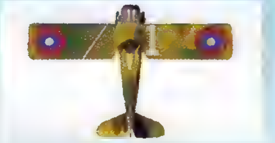
— *Bill Trotter*

The Aircraft

Nieuport 28: Fast, maneuverable, and skittish when you apply sudden power changes. Requires a gentle hand, otherwise it has an alarming tendency to shed its wings.

Fokker Dr.I Triplane: Yes, the Red Baron's weapon of choice! Superbly acrobatic and capable of snap maneuvers that its Allied opponents simply cannot match. It is, however, slower than they are.

Sopwith Camel: Great flyer but very demanding of a pilot's skill. It's quite unstable and must be constantly babied into proper flight position, but once you learn how to do that, you'll be a match for anything Jerry sends up.



Spad XIII: Stable, powerful, and very good in "dive and zoom" situations. Avoid fancier maneuvers when possible, because it flies like a brick at anything less than full power.

Albatros DIII: Essentially a scout plane, this puppy handles beautifully at altitudes of 12,000 feet or lower and has an unusually reliable engine.

SE5a: Strong, dependable, resistant to stalls—just don't let a triplane get on your tail or you'll be French toast.

checklist

DirectX
DirectDraw .... ☑

Specialty controllers
Throttle .... ☑
Rudder .... ☑

boot verdict

PRICE: $55
DEVELOPER: Rowan Software
PUBLISHER: Empire Interactive
PHONE: 301.916.9302
URL: www.empire.co.uk

7

4DVision **4D Paint** and Fractal Design **Detailer**

Paint your own wiremesh

3D painting has come to Windows NT, and 3D artists everywhere can rejoice. These 3D paint programs have the power of their workstation brethren, without the big price tag. The idea is simple: You paint in a realistic fashion directly on a 3D model, using common 2D paint tools. 4DVision's 4D Paint *and Fractal Design's* Detailer *are both exceptional, each with its own unique tools.*

— Gregory Pyros & Chris Rock

Import/Export

One of the first things the 3D artist must ask themselves is, "Can this program import and export the file formats I need?"

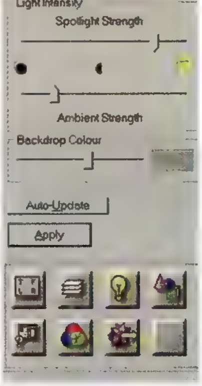
4D Paint imports and exports directly to and from *3D Studio Max* via a plug-in. One click from within *Max* and your selected geometry and all the accompanying mapping and materials are sent directly to *4D Paint*. Seamless integration with *Max*'s Material editor, and the ability to paint across multiple objects, maps, and even different mapping types makes *4D Paint* feel like a natural extension to *Max*. For those who use the DOS version, *3D Studio Classic*, *4D Paint* supports 3DS and PRJ files as well. 4DVision is also releasing a version of *4D Paint* that supports Microsoft's *Softimage*.

Detailer can import and export *3D Studio Classic* 3DS files, along with DXF and *Ray Dream Studio* format. *Detailer*'s biggest shortcoming is the lack of 3D object file support for the three biggest 3D programs on the NT platform: *3D Studio Max*, *Softimage*, and Newtek's *LightWave 3D*, although Fractal Design promises *Max* and *LightWave* support via a plug-in sometime during 1997.

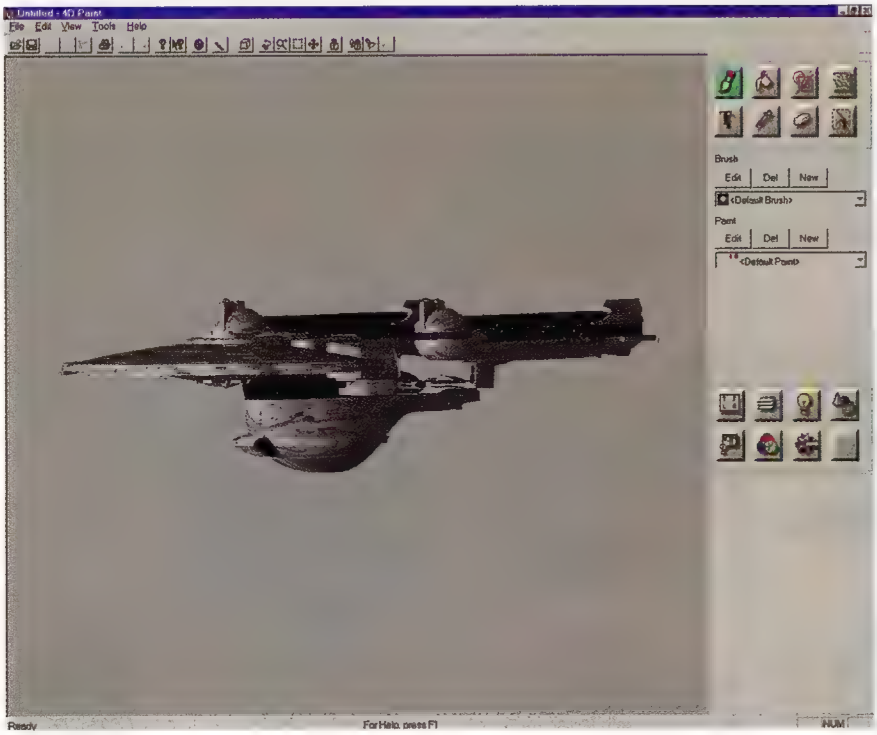
Toolset

Detailer's toolset is second to none, from designing original brushes to saving groups of brushes for particular projects, and the ability to use real-world painting mediums.

4D Paint sports many brush types, plus the ability to create custom brushes and paints which can affect more than one map type at a time, but it still falls short of the natural look and feel that *Detailer* delivers.



4D Paint's lighting controls only offer ambient light and one spotlight.



***4D Paint* offers a variety of brush types, plus the option of creating your own custom brushes and paints.**

Maps

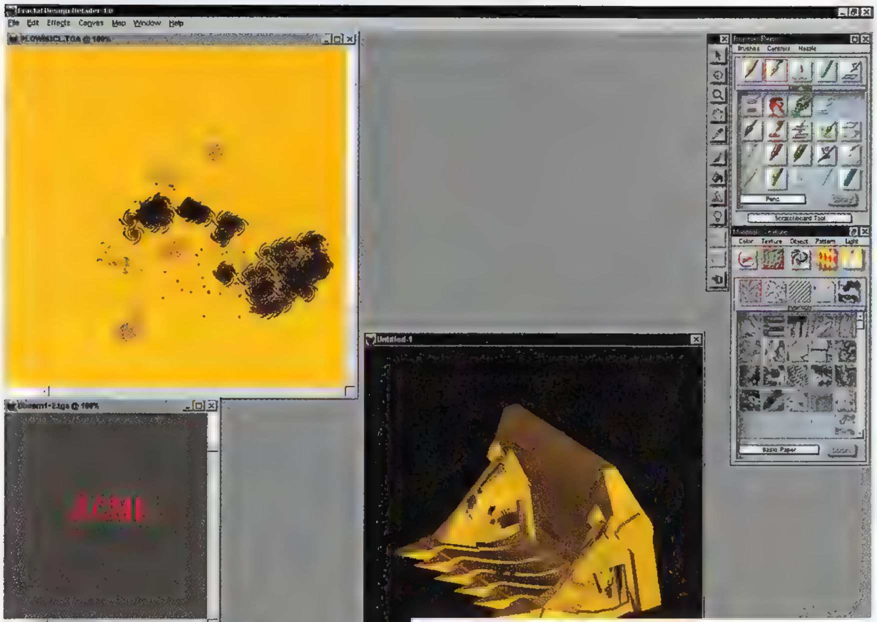
4D Paint excels at map usage, with the ability to paint on multiple maps and objects simultaneously; and with map management virtually invisible to the user, artists can do more of what they want to do—paint. Both *4D Paint* and *Detailer* support texture, bump, shininess (highlight), and self-illumination (glow) maps. In addition, *4D Paint* supports full-opacity mapping, while *Detailer* offers reflection mapping. One point in favor of *Detailer* is direct support for the use of *Photoshop* PSD files with layer support. (Both programs handle maps quite well, though.)

Detailer is a bit on the sluggish side when you use more than two map types, while *4D Paint* seems happy to let you use all the available map types with multiple layers before any serious performance hit can be noticed.

Lighting

Detailer is far beyond the competition when it comes to lighting controls. Each light within *Detailer* can have different color, brightness, and concentration settings. Placement is a breeze with the use of the Preview Sphere, where instant feedback on the intensity and fall-offs of your lights can be viewed and adjusted. Settings for the lights can be saved and reused later, which is very handy when you have to paint multiple models under the same lighting conditions.

4D Paint has only one spotlight and ambient light available, so lighting a complex model to



Detailer comes with a large selection of brushes and material types.

paint on can be difficult. The lights in *4D Paint* are permanently set to white, and controls are available for intensity only. Positioning of the one spotlight is fairly straightforward: either lock the light to the view port or dolly the light around the scene using rotation controls.

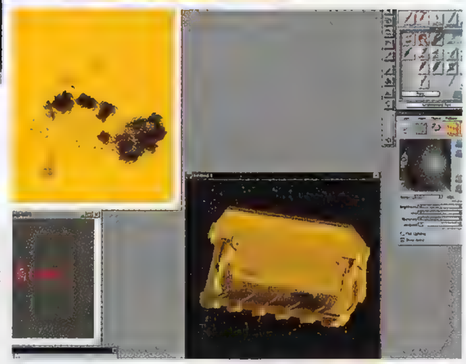
Memory Usage

While NT can run multiple programs at once, it is *highly* recommended to close all non-essential programs when using either *4D Paint* or *Detailer*. Memory usage in *Detailer* can quickly get out of hand. For example, when using a 3D view window at 640x480, it chews up a whopping 15MB (due to a 52 bytes per pixel 3D view port overhead). By comparison, *4D Paint's* 3D view port only requires 5 bytes per pixel.

Another very important point is the complexity of the 3D geometry that has been imported and the resolution of the bitmaps that have accompanied it. In testing the bulldozer model (above), *4D Paint* was able to handle it with ease, while *Detailer*'s memory usage was unacceptable.

Ease of Use

Detailer comes with an excellent full-color manual, replete with detailed explanations and illustrations. *4D Paint*'s manual is very concise, with fewer illustrations. Both companies offer web sites with frequent updates, but *4D Paint* goes one step further, offering a discussion page called the *4D Paint* Forum, where users can post about problems, or offer tips for other users.



Positioning lights is a breeze with *Detailer*'s Sample Sphere.

The Scoop

4D Paint should be the choice of avid *3D Studio Max* artists for the simple reason that *Detailer* currently doesn't import or export any of the program's native geometry formats. Also remember that this is 4DVision's first attempt at a paint program, 3D or otherwise, and though it's lacking in a few key areas such as lighting, the painting toolset is quite extensive. The seamless integration with *3D Studio Max* and the ease of use will keep you coming back for more.

Fractal Design has a good product on their hands. *Detailer* is extremely well-balanced, even with the missing import and export functionality. As could be expected from Fractal Design, the lighting and the painting toolset are very mature for a first version. The bulk of *Painter 4.0*'s toolset is included within *Detailer* and with the addition of *Ray Dream Studio*—a full 3D modeling and animation program which supports ray tracing, included for the $450 price—*Detailer* is a worthy addition to any 3D artist's toolkit.

Blast Marks

How to make your ships look battle-hardy

Creating blast marks on the hull of a spaceship is easy with *4D Paint*. The following is an example using *3D Studio Max* and *4D Paint* together.

① Prepare the model to be painted by applying appropriate mapping coordinates. In areas requiring greater detail, more specific mapping should be applied. *Max* has support for multi-subobject materials (a single model can have multiple textures and mapping coordinates assigned at the face level).

② In *Max*, select the model to be painted, and open the *4D Paint* plug-in. If there are no texture maps applied to the object, *4D Paint* will prompt for a new map size. Previously applied maps need to all be the same size.

③ Use the zoom and rotational controls to position the object in the view port.

④ Select the brush type that most closely resembles the scorching effect of a blast mark. *4D Paint* offers superb layering tools (similar to Adobe's *Photoshop*). By painting the scorch marks on several layers, you can easily go back and fine-tune the effect.

⑤ When you've finished painting, export the model to *Max*. *4D Paint* allows you to overwrite the existing maps, or to write new maps. The export back to *Max* is totally seamless. When naming the maps, it's recommended to use a four letter format, since *4D Paint* uses the last four digits in its naming convention. For example:

SCORM1CL.TGA
"SCOR" = user's four digit/letter prefix name
"M1" = number of the map
"CL" = color map type

⑥ For enhanced effects, *4D Paint* can also be used to create other map types (bump, shininess, and self-illumination) to add even more depth to the scorched area of the hull.

boot verdict

PRODUCT: 4D Paint
PRICE: $950
DEVELOPER: 4DVision Asia
PUBLISHER: 4DVision
PHONE: 800.252.1024
URL: www.4dvision.com

9

boot verdict

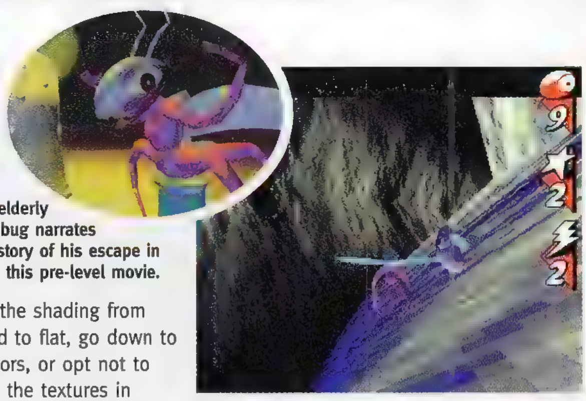
PRODUCT: Detailer
PRICE: $450
DEVELOPER: Fractal Design
PUBLISHER: Fractal Design
PHONE: 408.430.4000
URL: www.fractal.com

8

S/W

Banzai **Bug**

Straight-up buggin'



An elderly Banzai bug narrates the story of his escape in this pre-level movie.

Zooming through ducts on the way to the basement, Banzai is accompanied by his pal, Poolio.

Billed as "the flight sim with an attitude," *Banzai Bug* is a cross between a really slow flight simulator and *Sonic the Hedgehog*. If you buy into the notion that a corporate spokescreature such as Sonic actually has "attitude," you might just buy into this 3D game. If you're looking for a real flight sim, you'll probably be disappointed.

The plot, put forward in pre-rendered 3D Smacker cinemas, tells how Banzai, the flying insect you control, gets trapped in the Exterminator's house and must escape to tell his tale.

Visually, *Banzai Bug* is a treat. The insect-perspective world is painted in pastel-palettes up to 64k colors. The Rankin-Bass reminiscent environments are filled with solid-colored, light-sourced polygon objects, using only smidgens of texture maps.

A cubist collage of low polygon-count enemies plague you as you work your way from room to room, hovering with six degrees of freedom. With no first person point-of-view, you're always staring at the bug's butt as he flies through vents, under cars, and into light bulbs.

Your primary weapon is spit, which oddly seems to make attacking robobugs explode in a fiery ball. For additional offense, you can punch or "zap" attackers at close range.

Despite the relatively sparse scenes, you'll have to make trade-offs to achieve acceptable frame rates in *Banzai Bug*, even with the mightiest MMX-based machines. You can lower the resolution, reduce the shading from Gouraud to flat, go down to 256 colors, or opt not to load all the textures in order to escape single-digit frame rates.

Contrary to veiled claims of support for 3D hardware acceleration, *Banzai Bug* would not recognize a Vérité, 3Dfx, or Millennium card. The DirectX that supposedly drives the 3D can wreak havoc, so update drivers with care.

In a rare move these days, the game does not support any multiplayer options.

Still, in a jaded world of heavy-handed sims with the fate of the world teetering in the balance, it's refreshing to pilot a simple bug behind the refrigerator and barrel roll under the kitchen table to a soothing Brubeck-esque bop beat. Just don't expect any adrenaline in this ride.

— Alan Smithee

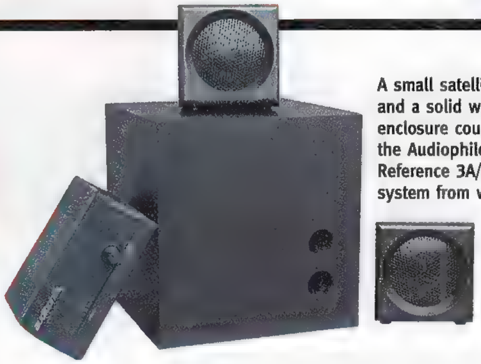
boot verdict

PRICE: $49.99
DEVELOPER: Gravity Inc.
PUBLISHER: Grolier Interactive
PHONE: 800.285.4534
URL: www.grolier.com

H/W

Audiophile Series 1 **Reference 3A/1000**

Pump down the volume



A small satellite footprint and a solid woofer box enclosure could not save the Audiophile Series 1 Reference 3A/1000 speaker system from weak bass response.

Straight from your car to your PC, Solstice Technologies brings their expertise of automotive audio to the desktop with the audiophile Series 1 Reference 3A/1000 speaker system.

The three-piece subwoofer/satellite system consists of two Reference 3A three-inch full range drivers, each housed within sealed, polyester resin enclosures.

Unlike most companies who've embraced high-impact plastic enclosures, the Reference 1000 subwoofer's four-inch dual voice-coil driver is housed in a half-inch laminated fiberboard enclosure. The dual-ported single-reflex bandpass enclosure ensures natural filtering of any unwanted high frequencies, and the 90Hz two-way passive crossover located within the subwoofer box helps with the filtering duties as well.

In a rare move, the speakers' power and volume controls are located in a separate box, which also houses the system's 40-watt amplifier.

The Reference 3A/1000 tries valiantly to produce optimal sound. At low and medium volumes, the subwoofer produces tightly controlled bass, while the highly directional satellites handle the upper frequencies cleanly. A word of warning: Prepare to work with speaker placement. With the satellites sitting directly on the desk, the sound appeared way below ear level—not acceptable. Moving them on top of your monitor raises the sound stage to ear level, and the satellite's ample shielding prevents any screen distortion. Our testing proved the satellites correctly placed voices across the sound stage, although the center channel wavered off-center.

But the subwoofer enclosure could not reproduce deep, bass fundamentals—especially at loud levels. Considering that the low frequency roll-off of this bandpass enclosure hovers at around 65Hz, it's no surprise that Pink Floyd's bombastic heartbeats failed to move any air. Telarc's digital recording of R. Strauss' *Also sprach Zarathustra* did not produce the earth-rumbling sensation other systems accomplished. Gibbing shamblers with your rocket launcher becomes an exercise in excessive mid-bass, with low frequencies causing the amplifier to clip horrifically.

The Audiophile Series 1 Reference 3A/1000 speaker system pumps out clean sound doing light duty, but simply cannot handle the stress of high-impact decibel reproduction.

— Andrew Sanchez

boot verdict

PRICE: $229
COMPANY: Solstice Technologies
PHONE: 612.941.4755
URL: www.cgo.wave.ca/~solstice

S/W

Office **Warfare**

Battle of the behemoths

How do you compare two suites of sophisticated applications offering more than 15 main programs, a chunky potpourri of scheduling, organizing and coordinating utilities, megabytes of clip media, and more? Both word processors, for example, have years of refinement behind their functions, and have more features than I've ever needed or wanted. My biggest frustration is figuring out how to turn off the toolbars and automated functions. The answer lies in how the applications are integrated.

— Tim Tully

Corel Office Professional 7

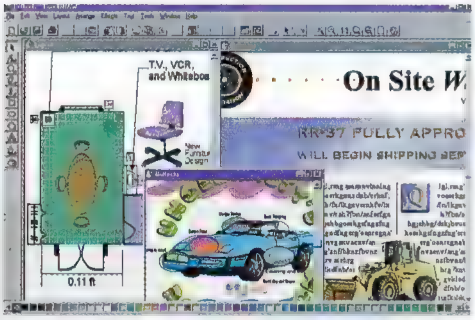
Corel Office Professional 7 has three core applications: *WordPerfect*, *Presentations 7*, and the spreadsheet, *Quattro Pro*. There are also the relational database, *Paradox 7*; *CorelDraw* and *CorelFlow* for business graphics; the organizer *SideKick*; *TimeLine* for project management; and others. It also includes a thousand fonts and various clip media.

Barista technology allows users to export, as Java programs, documents from the core applications that will run on any popular web browser. Corel's *Envoy 7* is an Adobe *Acrobat*-like program to which you can publish a document created in any Windows program.

Corel's DAD—the Desktop Applications Director—installs nine icons in your taskbar which launch its applications at a click.

DAD looks like a nice feature until you decide to install the second tier of Corel programs (which you can't install simultaneously with the core programs). But it can't install when DAD is running. You have to uninstall the entire suite of core applications, then install the secondary group of programs first, then the first group (including DAD) second, to avoid the DAD conflict. Phew.

You can create documents in *WordPerfect*, *Quattro*, and *Presentation 7* and save them as HTML pages with surprising ease and effectiveness. The only complaint with these functions is that the applications offer two options: publishing an HTML document, and creating a web document, and neither the manual nor the online help functions explain the difference. This, like much of *Corel Office Professional 7*, is apparently an effort to make the non-technical user more comfortable, but in turn, it makes the technically curious user uncomfortable, and is no help at troubleshooting time.



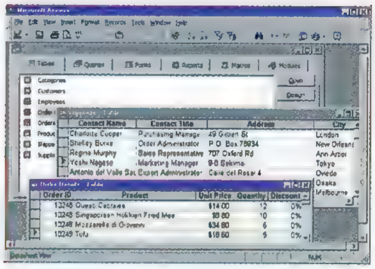
CorelDraw **lets you create simple graphics, and import dozens of graphics formats into *Corel Office Professional 7*.**

boot **verdict**

PRICE: $499
DEVELOPER: Corel, Quattro, Netscape, Borland, Time Line Solutions, Others
PUBLISHER: Corel Corporation
PHONE: 800.772.6735
URL: www.corel.com

9

Microsoft Office 97



Access lets you store and report on data based on its relationship to other data.

Microsoft Office 97 is built around the "97" (a.k.a. 8.0) versions of *Word*, *PowerPoint*, *Excel*, and the relational database *Access*. Other applications include *Graph*, which adds charting capabilities to *Word*, *PowerPoint*, and *Access* (*Excel* makes its own charts); *Outlook* handles e-mail, scheduling, contacts, and project management; and *Binder* works as an electronic consolidator of projects that use several applications, organizing, integrating, and distributing the project. *Binder* doesn't work with *Access* however, and seems a bit less intuitive than it could be.

Even though *WordPerfect* improved its already respectable HTML functions, MS *Word*'s web publishing capabilities have pulled ahead of *WordPerfect*'s, principally in simplicity and clarity, though not necessarily in output quality. It takes just minutes to create a decent HTML document with *Word* and the Web Wizard, creating tables, text wrap, and links, and the tools to refine it further are available. Likewise, it's a relative snap to turn *PowerPoint*, *Excel*, and *Access* files into web pages with all the trimmings.

Microsoft Office 97's answer to Corel's DAD is the Shortcut Bar, a taskbar-like device which appears along the right edge of the screen. The Shortcut Bar lacks the patronizing tone of Corel's equivalent, but in balance, *MS Office* has the annoying Office Assistant. This stamp-sized window automatically opens to display a painfully cute animated paper clip, with eyes that move, and which twitches constantly, displaying word balloons offering obsequious help. The performance of our 200MHz MMX Micron Millennium wasn't affected by these ornaments, but you wouldn't want to deal with them on a slower machine.

boot **verdict**

PRICE: $578.89
DEVELOPER: Microsoft
PUBLISHER: Microsoft
PHONE: 800.936.4400
URL: www.microsoft.com/office/

8

At the end of the day

Both Word *and* WordPerfect *have vastly more powerful and usable graphics, formatting (including tables and columns), highlighting and, notably, web publishing features than prior versions. The other main applications of each suite are also polished to a high gloss, and choosing one spreadsheet or database over another approaches nit-picking. No doubt, some deadline-bending, midnight oil-burning session will, at the worst possible time, uncover a fatal lacuna in* Excel*'s function set that* Quattro Pro *could handle with ease, or that* Paradox 7 *just isn't quite as relational a database as* Access. *But unquestionably, you actually could start up a business using either of these two packages and have your needs well covered.*

Corel gets extra points for including a dedicated graphics program. CorelDraw *is no* Photoshop, *but it can import and export dozens of formats, adding considerable graphic power. Microsoft's juggernaut also lacks an application-independent publisher like* Envoy *and a Java publishing technology such as* Barista.

IBM ComCentral 33.6

A pricey answering machine

Stacked up against the robust competition, the ComCentral comes out looking pretty skinny.

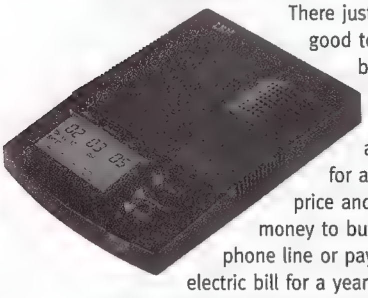
The ComCentral's redeeming features include a cool LCD display, providing plenty of information about the status of messages for mailboxes, faxes received, the time and date, in addition to the standard modem light indicators. Features such as call forwarding, Caller ID, distinctive ring, one set of phone/wall jacks for each of the two lines, pager notification, etc. are also included.

The ComCentral isn't billed as Plug-n-Play, and although installation is fairly simple, make sure you read the Readme portion of the install procedure to find out the exact numerical (i.e. cryptic) modem driver to install.

Transfer rates for text are very good, but data transfer is sluggish. A 1MB WAV file crawled at 16:12 at 1.06Kbps—and this was directly connecting at 26.4k to our server. Better results were achieved on the 1MB text file: 1:18 at 14.3Kbps.

However, when connecting to another 33.6 modem the WAV file transferred at 2072cps in 8:11. The text file at 33.6Kbps transferred in 2:55 at 6403cps—the best time we've obtained so far for that transfer.

The standard Hayes AT Answer command (ATA) wouldn't work, so we had to initiate calls. (It even failed to display the standard Ring notice in the terminal window whenever the phone rang.) Using both the included *HyperTerminal* and the *Dial-Up Networking* programs, the dial procedure didn't always dial all seven of the numbers. More often than not, we had to lift the telephone handset and manually push the last digit of the phone number to complete the call.



There just isn't enough good to outweigh the bad on this overpriced product. You could buy a better modem for a quarter of the price and use the extra money to buy a second phone line or pay the increased electric bill for a year after leaving your PC on twenty-four hours a day.

— DV

boot verdict

PRICE: $399
COMPANY: IBM
PHONE: 800.426.2968
URL: www1.ibmlink.ibm.com/HTML/SPEC/g2214316.html

5

The TelePort 33.6 blazes, and is even upgradeable to 56Kbps.

Global Village TelePort 33.6

Now that's a mouthful

boot KICK ASS! PRODUCT

The TelePort 33.6 may look like a toy, but, like a big-block Chevy Nova, it's got what it takes to impress under the hood.

As with IBM's ComCentral 33.6, the TelePort features a built-in speaker, built-in microphone, and a volume slider. In addition, there's an answer on/off switch, mute switch, and message-waiting light (which doubles as the data send/receive light). The back also has jacks for an external speaker and microphone.

Installation is a snap and the fantastic *Focal Point* software that's included integrates voice mail, fax, and e-mail. The Caller ID function goes one step beyond with call return at the click of a button. Details such as music on hold, conversation recording, and scheduled sending of faxes and e-mail messages just make the package sweeter.

The TelePort boasts screaming transfer rates. Transferring a 1MB WAV file via *zmodem* to another 33.6Kbps modem, the TelePort achieved a blazing 2185cps (7:53), and an astounding 5685cps (3:18) for a 1MB text file. It's surprising the plastic case didn't melt.

The only reason the TelePort didn't earn a bootVerdict of 10 is on account of its oversimplified single-LED interface.

We haven't even touched on the AudioSpan SVD (simultaneous voice and data)! Suffice it to say, you won't be disappointed. The teleport has all the features you could want now, plus the ability to seamlessly expand into the next wave of high-speed 56Kbps modems (for a small additional fee) when that technology becomes available.

— DV

boot verdict

PRICE: $229
COMPANY: Global Village Communication
PHONE: 800.329.9675
URL: www.globalvillage.com/

9

SupraExpress 336I Sp

Comma, comma, comma chameleon

All hardware installations should be so simple.

Plug in the SupraExpress 336I Sp's tiny ISA card, boot Win95, and insert the supplied floppy. No questions to answer, no buttons to click.

Gossip away as you normally would, while sending those data files in the background. To establish an ASVD call, use an AT-SMS=2,,,1# VLS=0 command. Annoyingly, this string must be entered before *every* ASVD call.

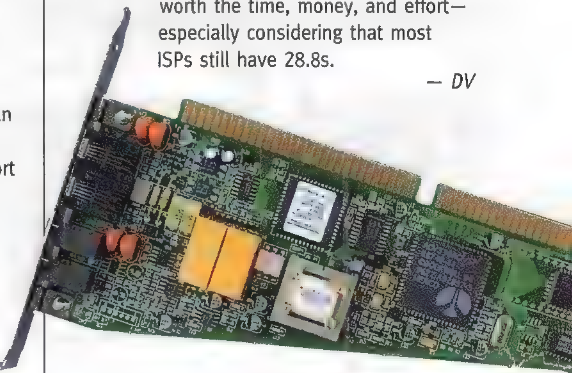
Sounding only slightly worse than a normal telephone call, the SupraExpress 336I Sp was quite intelligible and you can converse while sending data as if you had a second phone line.

As expected, the 336I Sp performs slightly better than a 28.8k modem. Transferring a 1MB text file from our server connecting at 26.4k took 5:48 at 3220cps and the same file sent to another SupraExpress took 4:51 at an impressive 3950cps.

All the SupraExpress manuals are in HTML format on a CD-ROM and this isn't the handiest format when installing hardware. The disc also contains a bunch of programs, including *Fax-Talk Messenger* by Thought Technologies with caller ID and remote notification, a demo of *WarCraft II*, and trial versions of *FarSite Lite* white-boarding software and *VDOPhone* for video conferencing.

As an upgrade for an 14.4Kbps modem, the 336I Sp is a good choice, considering its price and performance, but if you already have a 28.8Kbps modem, save your green-backs. A 16 percent speed increase is not worth the time, money, and effort—especially considering that most ISPs still have 28.8s.

— DV



boot verdict

PRICE: $129 int.; $149 ext.
COMPANY: Diamond Multimedia
PHONE: 800.727.8772
URL: www.diamondmm.com

8

AntiVirus v2.0 and PC-cillin II

Your best defense

Whether you're high-traffic and high-risk, or minimal change, low-risk, at some point you'll be at risk. Win95 lacks built-in virus protection, and its true multitasking environment, inclusion of trusted agents, and advanced communication and networking capabilities make it an ideal breeding ground for viruses.

Computer viruses don't rest, and neither does anti-virus software development. Two new versions promise to protect you against the onslaught of these little nasties: Symantec's Win95-compatible *Norton AntiVirus v2.0,* and TouchStone's *PC-cillin II,* which runs under Windows 95 and 3.x, and DOS. Installation and operation times for both products are comparable, although *PC-cillin*'s CD-ROM (vs. *NAV*'s four diskettes) makes its installation a little simpler. Win95 integration is pretty tight; both products allow files to be dragged and dropped onto a Scan window.

Both *NAV 2.0* and *PC-cillin II* run resident as 32-bit virtual device drivers (VxD)—Auto-Protect in *NAV;* Smart Monitor in *PC-cillin*—and use a combination of signature scanning, change detection, and heuristic analysis to protect against stealth, polymorphic, boot, program, common, and Macro viruses. Striker, *NAV*'s virus technology, is a polymorphic virus scanning engine touted to have virus-specific emulation monitoring (a "clean room" using 50K RAM to emulate a Pentium processor in which the polymorphic virus runs, blows its cover, and is then eliminated); and VICE (Virus Instructional Code Emulator), is *PC-cillin*'s equivalent technology for detecting unknown, polymorphic, and mutation-engine viruses.

Rapid virus proliferation means keeping your virus signatures database up-to-date is a must. The second generation of *NAV* has a Virus List that includes around 9,200 viruses, and the new Live Update feature provides monthly virus definition file updates and software updates from the Symantec web site or BBS.

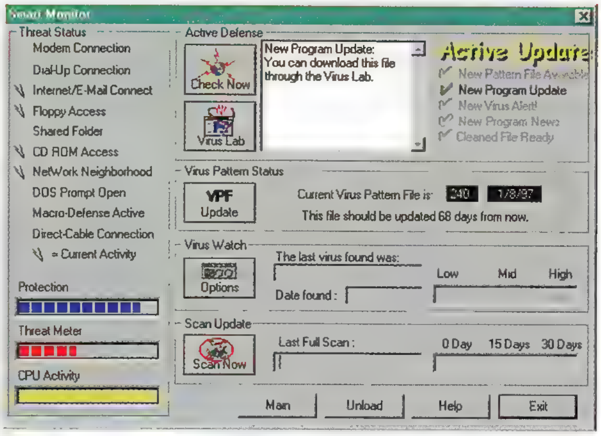
PC-cillin's Active Defense updates virus pattern files utilizing a built-in ActiveX web browser that automatically downloads the latest virus signatures in the background from the *PC-cillin* Internet Virus Lab. *PC-cillin*'s database of virus info (Virus Encyclopedia) is more detailed in its descriptions of viruses and their activity than *NAV,* however the signatures only number around 5,500.

Both utilities include Wizards to hold your hand through the clean-up process. Repair Wizard (*NAV*) and Clean Wizard (*PC-cillin*) each handle virus elimination automatically, but you also have the option of dealing with the virus manually by either cleaning or deleting infected files, or renaming them (you can customize the backup extension in the process of backing up a file before attempting a repair).

PC-cillin automatically monitors online risks, adjusting scanning levels based on your system's activity, while *NAV* requires more user participation. Both programs scan files as they're downloaded from the Internet with negligible effect on download times, and also scan compressed files. However, *PC-cillin* scans PKZIP, LZExe, and MS Compress files in addition to ZIP, LHA, and LHZ. Settings such as frequency of scans, what is scanned, and how the program alerts you to suspicious activity can be customized for each program.

All up, the feature sets of *PC-cillin II* and *Norton AntiVirus 2.0* are pretty much on par. But given the choice between protection with a greater number of virus signatures, and detailed virus descriptions, it's preferable to be well-protected than know the exact workings of every DAME, Arianna, and Joanna virus.

— *Ingrid Bush*

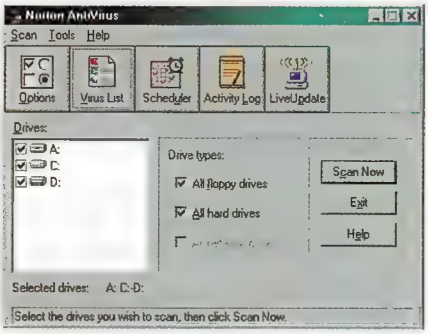

Smart Monitor
Threat Status
Modem Connection
Dial-Up Connection
Internet/E-Mail Connect
Floppy Access
Shared Folder
CD ROM Access
NetWork Neighborhood
DOS Prompt Open
Macro-Defense Active
Direct-Cable Connection
= Current Activity
Protection
Threat Meter
CPU Activity
Active Defense
Check Now
Virus Lab
Active Update
New Pattern File Available
New Program Update
New Virus Alert!
New Program News
Cleaned File Ready
Virus Pattern Status
VPF Update
Virus Watch
Options
The last virus found was:
Date found :
Low
Mid
High
Scan Update
Scan Now
Last Full Scan :
0 Day
15 Days
30 Days
Main
Unload
Help
Exit

New Program Update:
You can download this file through the Virus Lab.

Current Virus Pattern File is: 240 1/8/97

This file should be updated 68 days from now.

***PC-cillin II*'s Smart Monitor is the main control center, offering info about the program's activity.**


Norton AntiVirus
Scan
Tools
Help
Options
Virus List
Scheduler
Activity Log
LiveUpdate
Drives:
A:
C:
D:
Drive types:
Scan Now
Exit
Help

☑ All floppy drives

☑ All hard drives

Selected drives: A: C:-D:

Select the drives you wish to scan, then click Scan Now.

***Norton AntiVirus 2.0*'s user interface is clear and simple, but lacks automatically updated risk status info.**

Dr. Solomon's Anti-Virus Version 7

Norton AntiVirus 2.0 and *PC-cillin II* are solid packages, but *Dr. Solomon's* hefty feature set puts it in the lead. The early version we looked at offered the same basic features as *NAV* and *PC-cillin,* but was outstanding in its thoroughness and powerful detection capabilities, with the inclusion of more virus-detection technologies and the ability to detect a greater number of viruses (10,256 signatures in its database) than either of the other programs. The Virus Encyclopedia is the most detailed and comprehensive of the bunch, with monthly updates for your virus signatures database available from Dr. Solomon's web site.

The program runs under Windows 95 and 3.x; the user interface is intuitive—an improvement from previous versions; and the doctor is more right-mouse button savvy than the other two products—just right click to check a file for viruses. Also, 24-hour support is available for the panic-stricken, virus infected. The doctor definitely has it under control.

boot verdict

PRODUCT: Norton AntiVirus v2.0
PRICE: $69.95
DEVELOPER: Symantec
PUBLISHER: Symantec
PHONE: 800.441.7234
URL: www.symantec.com

8

boot verdict

PRODUCT: PC-cillin II
PRICE: $49.95
DEVELOPER: TouchStone and Trend Micro Inc.
PUBLISHER: TouchStone
PHONE: 800.531.0450
URL: www.checkit.com

7

boot verdict

PRODUCT: Dr. Solomon's Anti-Virus v2.0
PRICE: $49.95
DEVELOPER: Dr. Solomon's Software
PUBLISHER: Dr. Solomon's Software
PHONE: 888.377.6566
URL: www.drsolomon.com

9

A Tale of Two Fragfests

Time to feed your first-person fetish

You've finished Quake. *You're done with* Duke. *The question is: What to do until* Unreal? *You could always hunt dog-headed aliens through labyrinthian Egyptian catacombs, or fight to the death for swell prizes in a futuristic game show. At least, these are the ideas behind two new first-person shooters vying for your attention while you've got time to kill.* — *Andrew Sanchez*

Powerslave

In the ever-shrinking world of 2 1/2D ray-cast games, *Powerslave* tries valiantly to stake a claim by offering up an Egyptian-flavored clash with otherworldly no-goodniks. While it has its moments, *Powerslave* is ultimately too little, too late.

You'd think that after the stomping Duke handed out in Los Angeles, any sane alien race would think twice about invading good ol' Terra. Well, terror from the sky reigns supreme once again, and guess who's sent in to chew bubble gum and kick ass? Duke Nukem? No. But Playmates Interactive has the next best thing: *Duke*'s *BUILD* engine.

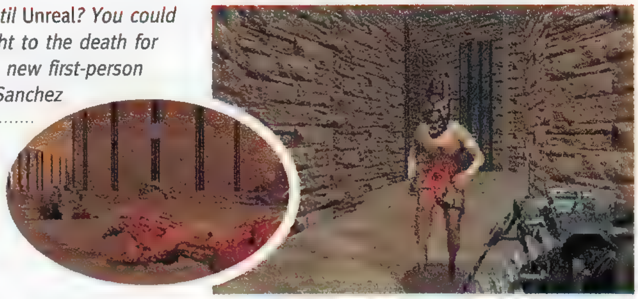
Venture through the dark 640x480 256-color ziggurats of the ancient Egyptian city of Karnak with your trusty M-60 assault rifle and machete in hand, and see the world in either a first- *or* third-person perspective.

Every object you encounter exists as 2D sprites, from the miasma of monstrosities to all the power-ups and weapons littered about. This isn't necessarily a bad thing—except that the hordes of piranhas, mummies, and Anubis zombies stutter step through *Powerslave*'s missing frames of animation. Some of the critters, such as the spider-like Terrainians, suffer from both bad artwork *and* pixelation.

Still, *Powerslave* does pull off stacked sectoring (allowing movement between multiple floors within a single level), which makes four-player deathmatches over a network more engaging.

The music is sufficiently exotic, but all the other sounds border on inane. The yapping of the spiders (not an animal normally noted for its call) sounds more like a puppy than an arachnid and lends new meaning to the term "barking spiders." And your alter ego's occasional spurts of profanity are nothing special, plus there's no parental lock to keep kids from the s-word.

But for every extra little detail that's thrown in, such as the gurgling pool of blood that puddles when you die or your shredded arm flopping to the floor after you fall victim to an explosive death, there are major nit-picks, such as the lack of an on-demand save-game feature (you only save at the *end* of levels) and the sluggish frame rates—even on a P200 MMX. These shortcomings drive the final nail into *Powerslave*'s sarcophagus.



I don't want to die... why can't I live on?

Introduce these Anubis zombies to your M-60 assault rifle in *Powerslave*.

boot verdict

PRICE: $39.99
DEVELOPER: Lobotomy Software
PUBLISHER: Playmates Interactive Entertainment
PHONE: 714.428.2112
URL: www.playmatestoys.com/piehome.htm

7

XS

The future is a mad, mad, mad, mad world filled with all manner of deranged individuals—and you're one of them. Everyone's competing for glory and a "most serious prize" in *XS*, a first-person shooter that, unlike *Powerslave*, resides in a 3D texture-mapped polygon world.

Enter the arena with three equally dysfunctional individuals, all armed to the teeth. To win, you must survive all 20 arenas in one piece. There are no keys to find, no levels to exit—it's all about bathing in the heat of gunfire and incendiaries and hoping your shields hold up long enough to put a bullet between your opponent's beady little eyes.

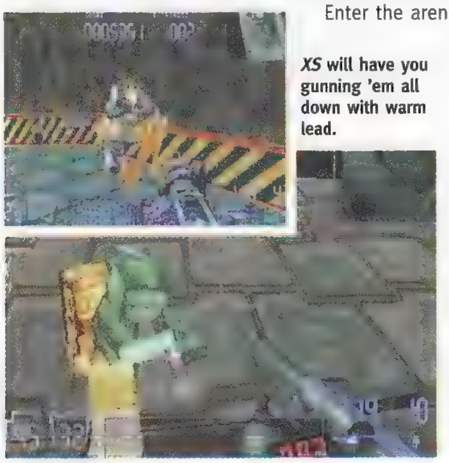
Alas, it'll take more than a bullet to stop your fellow contestants. Everyone in *XS* has an energy shield that envelops them in a semitransparent box, similar to those in the movie *Dune*. Prepare to empty entire cartridges as you spend minutes upon minutes chasing your cowardly competition. Murder made boring.

This "run away" strategy is one of *XS*'s unique features. The computer's AI will make an opponent retreat, try to gain a better vantage point, and actually attempt to outmaneuver you.

Unfortunately, *XS*'s band of baddies just don't move realistically—looking like they're doing the moon walk rather than a menacing march. Also, the low-resolution texture maps make for a mighty pixelated world. Not even light sourcing can save this visual travesty.

It's a shame, really. The designers of *XS* went to great lengths, creating more than 60 crazy looking opponents from cyborgs to shotgun-wielding man-bats to cyber-babes with looks that kill. There are even cinematic cut scenes rendered in *Softimage* liberally sprinkled throughout.

XS has its moments, but even with multiplayer capability, it stands for "excessively slow."



***XS* will have you gunning 'em all down with warm lead.**

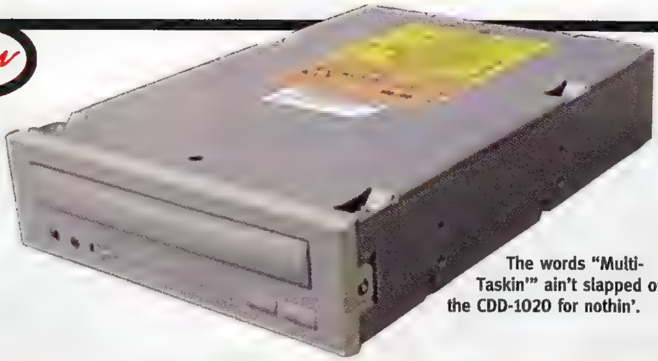
A plentiful supply of boxy adversaries eagerly await you in *XS*.

boot verdict

PRICE: $44.99
DEVELOPER: Sales Curve Initiative
PUBLISHER: GT Interactive
PHONE: 800.305.3390
URL: www.gtinteractive.com

b

H/W



The words "Multi-Taskin'" ain't slapped on the CDD-1020 for nothin'.

Wearnes **CDD-1020 Multi-Taskin'** 10X

A workhorse that gets work done

A 10x IDE CD-ROM drive to the power user seems silly in the presence of 15x and 16x drives, but speed, as they say, isn't everything; or was that size?

Enter, Wearnes Peripherals. They promise not only improved performance, but record CPU utilization compared to the competition. Why, you may ask, should I give a damn about CPU utilization? Because when you access data from an IDE CD-ROM drive, it tends to chew up a large chunk of your CPU's processing power. This in turn degrades the performance of other applications running in the background and hinders your attempts to run new ones.

Have they succeeded?

The numbers speak for themselves.

We tested this PMA drive under OSR/2 (the current version of Win95), which supports EIDE bus mastering Direct Memory Access (DMA) devices. OSR/2 alone, however, is not enough. Your motherboard BIOS needs to support DMA as well. If it doesn't, check into upgrading, because the difference is staggering.

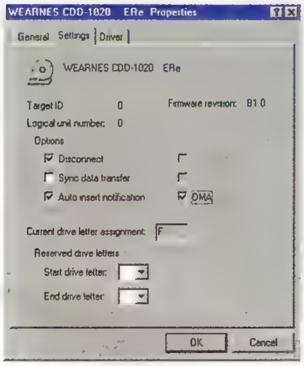
The specs tout this drive as exceeding MPC III standards with a CPU utilization of less than seven percent; our tests came in at an unbelievable four percent. Tests with the DMA option turned off delivered a reasonable 29 percent, which is still damn good compared to any of the other IDE CD-ROM drives that we've seen. Throughput numbers failed to keep up with the specs, though. Wearnes' claims of a data transfer rate of 1500K/sec were a full 30 percent inflated according to our WinMark 96 results, which put transfer rates closer to real-world speeds of 12x drives (926K/sec). And the average CPU utilization of those drives is between 60 to 85 percent.

The drive sports a 256K buffer clocking in at 128ms, and hopping behind the wheel of the CDD-1020 only reaffirms its zippy nature. If you work with large amounts of data though, you may want to consider a faster drive. After all, a few extra hundred K every second really adds up. Transferring 579MB to the hard drive took a full minute more than 12x drives we've tested, taking an average of 6 minutes, 42 seconds; and DMA is of no help here at all.

Other features include support for Kodak Multi-session Photo-CD, CD-Digital Audio, CD-XA, CD-I, High Sierra (ISO 9660), CD-Plus, Enhanced CD, and i-trax. The CDD-1020 even sports a great Random Play feature.

The Wearnes CDD-1020 may not deliver the balls-out speed of other, higher spec'd drives, but this low CPU-crunching IDE drive will allow true power users to keep tasks spinning.

— *Sean Cleveland*



WEARNES CDD-1020 ERe Properties

WEARNES CDD-1020 ERe

Target ID 0

Logical unit number: 0

Firmware revision: B1 0

Options

☑ Disconnect

☐ Sync data transfer

☑ Auto insert notification

☐

☐

☑ DMA

Current drive letter assignment: F

Reserved drive letters

Start drive letter:

End drive letter:

Turning on DMA is not Plug-n-Play and needs to be turned on manually. Are you sure DMA doesn't stand for Device Management Anguish?

boot verdict

PRICE: $130
COMPANY: Wearnes Peripherals International
URL: mars.asiabiz.com.sg/~whwang/

9

Magnum 6

This stick is shooting blanks

Looking for a good joystick? This isn't it.

There's something about the Magnum 6 that feels very familiar. The elongated shaft, rubber grip, protruding head, and wrist support base certainly won't win any industrial design awards (even with the tiny airplanes stamped into the molding), but the overall ergonomics are severely disappointing: the shaft is far too long, making it difficult, nay impossible, to reach the four-way hatswitch; the trigger button is recessed way too deep in the handle; and the rear button is irritatingly inaccessible. The joystick also has a propensity to tip over, thanks, in part, to the well-endowed handle and lightweight base.

The Magnum 6 is equipped with DirectInput drivers, and once installed, you can choose from three modes of operation: six-button, four-way hatswitch, and throttle. Although the four-way hatswitch and throttle modes work sufficiently, you can't enable the hatswitch and throttle simultaneously. And even though there are 12 fire buttons in total, Win95 only recognizes four of them. And, to make matters worse, the buttons on the bottom base aren't independent, they only duplicate the actions of the top buttons.

Also stuffed into the box is a software driver that allows you to control your desktop mouse with the Magnum 6 joystick. This idea may seem appealing, but it's not practical, especially since the joystick is analog and the mouse is a digital device. To compensate, you'll have to adjust your mouse sensitivity to the highest setting, and even then, it's virtually impossible to control movement with any accuracy. You can adjust the dead zone (or area of movement), but frankly, it isn't worth the hassle.

The Magnum 6 was fluid enough in the games we tested (*Jazz Jetfighter III* and *MechWarrior 2*), but the overall design flaws are hard to bear. The joystick race is crowded with competitors, but the Magnum 6 brings up the rear.

— *Bryan Del Rizzo*

It may be butch, but the Magnum 6 sure isn't much fun to use.

boot verdict

PRICE: $39.95
COMPANY: InterAct
PHONE: 800.732.6866
URL: www.interact-acc.com

2

boot labs Review Policies

***boot** isn't like any other computer magazine, and neither is our product **evaluation** process. We don't test equipment in the cold, sterile environment of a warehouse-sized lab, and we don't write our reviews based on the **test scores** that lab-coat-wearing technicians scribble on clipboards.*

*Our review **scores** are based on a combination of objective **benchmark** testing, real-world performance, and our **subjective** evaluation of features, performance, and the many less tangible **characteristics** that go into a product. All of our evaluations are based on **hands-on** use of the product.*

boot KICK ASS! PRODUCT

Only the **best** earn enough respect to be worthy of our **editors'** **choice** award.

5
WINDOWS GRAPHICS
5
DESCENT II
5
QUAKE
1 2 3 4 5 6 7 8 9
BOOT RATING
boot-o-meter
5
PREMIERE TRANSITION
5
PHOTOSHOP FILTER
5
LIGHTWAVE 3D RENDER

The boot-o-meter explained

For our tests, we use Ziff-Davis' WinBench 96 suite of benchmarks to measure CD-ROM and hard-disk drive performance (kilobytes per second), as well as graphics speed under Windows (millions of pixels per second).

All systems are tested at 1024x768 resolution with 16-bit color depth. All notebooks are tested at 800x600 resolution with 16-bit color depth (they're also tested at higher resolutions, if higher resolutions are supported).

We judge DOS video performance by measuring the number of frames per second that a system is capable of pumping out while playing games such as *Descent II* (at 640x400 resolution) and *Quake* (at 640x480 resolution on desktop systems; 320x480 res on notebooks).

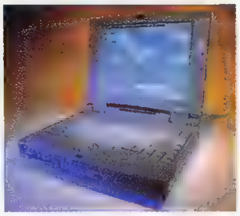
In our real-world tests, we measure how long it takes a system to perform specific tasks: rendering a video transition in Adobe's *Premiere*, applying a Gaussian-blur in *Photoshop*, and rendering a wireframe scene in NewTek's *LightWave 3D*.

The performance is gauged on a scale of 1 to 9 in each of these areas; we then average the scores, and arrive at an overall performance rating. The details of each test (specific frame counts and such) are always available on the *bootNet* Web site at **www.bootnet.com**.

Our performance scales are based on systems that we consider to be among the best in their class, and we change those reference standards every six months. If the system reviewed equals or exceeds the performance of the reference platform (a score of five or better), the boot-o-meter dial is green; if it scores a four, the dial is yellow; and if it scores a three or less, the dial is red.

Our Reference Desktop PC

***Gateway's P5-166XL** is our reference desktop computer because it's a workhorse, delivering solid benchmark scores all around. Systems shipped since the P5-166XL—especially 200MHz Pentium systems—should at least match its performance.*



Our Reference Notebook PC

*We selected **Fujitsu's Monte Carlo** as our reference notebook because of its excellent benchmark scores. The Monte Carlo's use of more expensive VRAM, instead of the slower DRAM, resulted in exceptional graphics performance.*

The bootVerdict

8

The fastest computer in the world is useless if it's poorly designed. That's why we evaluate a host of subjective criteria in addition to rigid benchmarks. We look at a machine's overall design, its ergonomics, expandability, ruggedness, and advanced features.

We also carefully consider a manufacturer's component choices, including the quality of the sound card, speakers, modem, keyboard, and mouse. We count expansion slots and drive bays. We take off the case and put it back on. We plug in drives and cards to judge how easy—or difficult—it is to expand the machine. These might seem like minor considerations, but they have an enormous impact on the level of satisfaction a new computer delivers. Our final rating is an amalgamation of the objective benchmark ratings and these subjective judgements.

DOUBLE TAKES
GIVE A SECOND EDITOR'S HANDS-ON OPINION OF THE SYSTEM BEING REVIEWED.

boot radar

PRODUCT ANNOUNCEMENTS: THEY **TELL** US, WE **PASS** IT ALONG

Now You See Me. Click. Now You Don't

The **ViaTV Phone** is a simple and inexpensive videophone, which uses standard telephone lines to provide telephone-quality audio and video for the price of a normal local or long-distance telephone call.

The size of a soft-bound book, the $499 ViaTV utilizes a video communications processor (VCP) chip, a color, digital video camera, and a high-performance modem, which are then connected to a telephone and television. The telephone's keypad serves as a remote control with all ViaTV capabilities accessed through intuitive menus displayed on your television. Full-screen, video-window, and local-view modes are supported.

8x8 Inc.: 888.843.9898; www.viaTV.com

Place Your Bets

If you're hoping to win big in Vegas, check out **Avery Cardoza's Casino**, a complete casino experience and professional gaming tutor with 3D graphics and more than 60 game varieties including blackjack, double odds craps, slot machines, video poker machines, and virtual Keno.

Casino retails for $49.95 and includes: a 3D casino simulation with interactive, multiplayer action; fully animated dealers; more than 10,000 hand-enhanced animation frames; and hours of recorded dialogue.

Using the "Ask the Expert" tutorial, you'll soon be playing 16 vs. 10 blackjack, finding slot machines ripe for winning, and turning hot crap rolls into monster wins. A free strategy book is included with the CD-ROM.

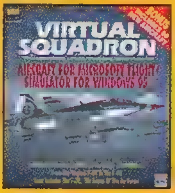
Cardoza Entertainment: 800.577.9467; www.cardozaent.com

For Flight Fanatics Only

The United States Thunderbirds have been flying air shows and dazzling crowds for more than 40 years. Throughout their long history, they have flown the best aircraft in the U.S. Air Force, and now you can too, with **Virtual Squadron**, an add-on for Microsoft's Flight Simulator for Win95.

The Virtual Squadron "Thunderbirds" pack includes every aircraft flown by the T-Birds, recreated with amazing detail.

The Thunderbirds use a different paint scheme for every plane they fly and each aircraft in the game is rendered exactly like the real thing. Planes include the F-84 Thunderjet, F-84F Thunderstreak, F-100 Super Sabre, F-105 Thunderchief, F-4Phantom II, T-38 Talon, F-16 Fighting Falcon, and even the F-22—the future of the USAF.



Virtual Squadron requires a registered version of Flight Simulator for Win95, and is available for $29.99.

Micro Star Software: 800.777.4228; www.microstar-usa.com

Solid Chocolate Bunny

A new book called **Easter Eggs—Software Secrets**, tells you where to look in the most widely used software applications to find out where developers cleverly hide serious, silly, and downright outrageous photos, credits, graphics, messages, and more.

Easter Eggs-
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Beginner's Series

Inside the book, you'll discover the origins of Easter Eggs (software, not chocolate), and learn how they have evolved in complexity and humor over the years. Instructions for Easter Egg hunting newbies and snooping tips for advanced users are included in addition to the hundreds of documented eggs in favorite games and applications including Windows 95, Microsoft Office, WarCraft II, Doom II, Phantasmagoria, and more. Easter Eggs—Software Secrets is available now for $16.95.

Abacus Books: 800.451.4319; www.ibb.com/rpd.html

This 'Aint No ViewMaster

The **VisionMaster 500** is a new high-end 21-inch monitor featuring a video bandwidth of up to 240MHz and a sync frequency of up to 110kHz horizontally and 160Hz vertically.

The VisionMaster 500's high resolutions, including 1800x1440@73Hz and 1600x1200@85Hz, make it ideal for graphics-intensive and advanced imaging applications. The three button on-screen display contains menus for up to 20 quick-and-easy image settings including contrast, brightness, image shift, and vertical hold.

The VisionMaster 500 is also Win95 Plug-n-Play compatible and is expected to ship in April for $1,795.

iiyama North America: 800.594.7480; www.iiyama.com

Relentless Fun

Activision has acquired the distribution rights to **Twinsen's Odyssey**, the sequel to Relentless, and Little Big Adventure. The game is slated for release in summer '97 and will retail for $49.95.

The title continues the saga of the lovable Twinsen as he explores and defends a vast and enchanted universe. When aliens from a neighboring planet arrive and begin kidnapping magicians and children, Twinsen battles the aliens' evil leader, the Dark Monk, to restore peace to the planet he loves.

Twinsen's Odyssey seamlessly integrates 3D polygonal characters in beautifully pre-rendered texture mapped environments to deliver lush, graphically dramatic gameplay.

Activision: 800.477.3650; www.activision.com

Software for Eye Care

Eye2Eye vision care specialists have introduced **Solutions in Sight**, the comprehensive visual ergonomic software and remedial treatment program designed to alleviate Computer Vision Syndrome. CVS is a potentially serious health, comfort, and productivity risk for millions of computer users worldwide, costing more than a billion dollars a year in medical care.

The Solutions in Sight system is comprised of four software programs to help relieve common CVS symptoms such as blurry vision, dry, red burning eyes, and headaches. The $49.95 Solutions package also includes information explaining CVS treatment methods through the use of proper lighting techniques; optimum viewing distances; and ideal ergonomic design of computer workstations preventing poor posture resulting in neck, shoulder, and back pain.

Eye2Eye: 888.393.2393; www.eye2eye.com

Sleek and Sexy LCD

Sharp Electronics' **NoteVision** is a slim, compact, high-performance multimedia LCD projector, with a carrying weight of just 15.4 pounds, and a maximum SVGA resolution of 800x600.

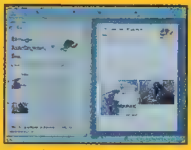
The NoteVision has a small footprint—only slightly larger than a piece of ledger paper—and an ultra-compact design that's less than five inches high. In addition to the built-in carrying handle, wireless remote, and stereo audio the NoteVision also includes a free copy of Astound, an interactive software application for presentations. Using the 1 to 1.4 manual zoom lens, screen images can be projected anywhere from 40 inches to 300 inches wide, making it useful for large group presentations.

Sharp Electronics Corp.: 201.529.8731; www.sharp-usa.com/products/pro

I Claudius

Design Intelligence has just released **i publish**, a new generation of publishing tools designed to simplify the process of producing professional-quality print, screen, and web pages for a variety of business and personal needs.

i publish makes it easy to merge text and graphics from virtually any source, including open applications, hard drives, CD-ROM, or the Internet, ultimately creating professionally designed documents. You can experiment with numerous layouts, easily shifting from one design to the next to achieve a look that's just right, all with point-and-click simplicity. A multi-mode publishing capability lets you view and publish information in multiple print layouts, on-screen presentations, or as linked HTML documents. Documents can also be customized with design effects such as color, font, graphics, and paragraph formats.



A free beta release is available now. The final retail release is slated for April with an anticipated street price of $149.

Design Intelligence Inc.: 206.343.7797; www.design-intelligence.com

Wheel and Deal

The new edition of **Consumer Reports Cars: The Essential Guide** interactive CD-ROM covers everything you'll ever need to know about selecting, purchasing, and maintaining a car, and contains current and comprehensive information about new and used vehicles from 1988 through 1997.

The CD-ROM evaluates and rates cars, minivans, pickups, and sport utility vehicles, as well as auto products and car accessories. It features: a personal car selector to help identify the right car for you; an interactive negotiation video to help you practice bargaining techniques with car dealers; and a financial calculator to help you compare purchase vs. lease options.

Consumer Reports
CARS

Consumer Reports Cars is available for Windows 95 and 3.1 for $19.95.

Creative Multimedia: 800.262.7668, ext. 511; www.creativemm.com

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A HOUSE DIVIDED

01/27/97 08:05 <Irene>
To my loving children and husband: Since none of you seem to be using the message board that I posted on the fridge, I've decided to go digital with our own Reilly family Telnet server. All important notes should be posted to "reifam.com 6778" from this point on. With love, Mom.

01/27/97 15:49 <Erica>
Mother: Your decision to exploit technology for your own megalomaniacal needs is alarming indeed. One must wonder if you're merely power tripping, or actually intent on destroying our minds. Whatever. I've notified Social Services of your indiscretion. You should expect a rather shattering visit from a local investigator within the next few days. As far as dinner goes, you can start without me. I'll be here at the Java Source, chatting on CityNet until 8 or 9. —Erica. :-p

---

01/27/97 16:20 <Hugh>
Honey: Give me a call at work if you get this message. I have no idea what I'm doing, and I <***ERROR***>

01/27/97 17:01 <Timmy>
ATTN LUZERS: I am the eRADicaTor! My power knows no bounds! If you wish to maintain control of reifam.com 6778, you will deposit six boxes of Captain Crunch, a quart of milk, and the February *Playboy* at the bedroom door of one Timmy Reilly by no later than 21:00! Do NOT attempt to negotiate this order! The eRADicaTor has spoken!

01/28/97 08:12 <Irene>
Erica: I am not trying to destroy your mind. I'm simply trying to get a better idea of how much meat I should be defrosting for dinner. Hugh: It's OK to ask for help. Your I.S. manager's name is Derek. Please consult him before you try Telneting again. Timmy: If you have special food requests, you can unlock your door, come downstairs, and ask me nicely.

01/28/97 15:39 <Erica>
Mother: Your fascistic preoccupation with thought control was today's topic in 5th period social studies. Mr. Causwell asked if your campaign of terror also includes subliminal messages (such was the cunning of well-known Satanist Aleister Crowley). I told him that I had no idea, and he interpreted this as proof positive that you have already seized at least partial control of my mind. Fearing that your mania will eventually destroy me, Mr. Causwell invited me to live with him and his family as a ward of the state. We will be discussing the transition over dinner at his house tonight. Don't wait up. (BTW: Leave my computer on; I'm dumping my disk into one of the Causwell's spare gig drives; tell Timmy I'm sorry about the bandwidth drain.)

01/28/97 15:42 <Hugh>
Irene: You were right, honey, Derek was very helpful. He taught me how to "jack in," and he even gave me a mouse pad that looks like a pizza! :-) On a more disturbing note, I'm concerned about this "eRADicaTor" fellow. Do you think he knows where we live? Derek said most "hackers" are harmless, but what if <***ERROR***>

01/28/97 17:06 <eRADicaTor>
The eRADicaTor is VERY disappointed with the elder female Reilly unit! The eRADicaTor's requested booty did NOT appear at Timmy Reilly's bedroom door at the designated time! Young master Timmy has also informed the eRADicaTor that cauliflower was forced upon him at dinner last night—this in direct violation of the Cauliflower Non-Aggression Pact signed by Timmy and the elder Reilly units on 11/12/96! To prevent COMPLETE and UTTER termination of reifam.com 6778, you must now make good on the Captain Crunch and the *Playboy*, AND submit a Daisy air rifle at the foot of Timmy Reilly's bedroom door by no later than 21:00! (You get an extra hour to run down to Discount Mart to buy the gun.)

01/29/97 07:57 <Irene>
Erica: You may not live with the Causwells. They smoke marijuana, and have received neighborhood demerits for letting their lawn go. Come home tonight, and I'll give you 50 more megs on the web server. Hugh: I've arranged a special training session between you and Derek for this Saturday. Bring a notebook and an open mind. Timmy: The school bus is honking. Come downstairs immediately.

1/29/97 15:34 <Erica>
Mother: The retarded cubicle drone at Social Services believes my case against you lacks merit. I therefore accept your offer of 50 extra megs, and resign myself to being a fully *non*-emancipated minor for the next 427 days. I must inform you, however, that from this point on, I, Erica X, will no longer be posting to reifam.com 6778. In other affairs, I cast my vote for Sloppy Joes tonight. Have a normal day. :-|

01/29/97 16:11 <HuGH>
Dear my wife Irene: Let's play it safe and give the eRADicaTor what he wants. Run downtown and pick up the cereal, the *Playboy*, and the air rifle, and while you're at it, see if you can score some illegal fireworks. (There's a guy at Tiller Park who sells them out of a red Pathfinder. He goes by the name Kick, and he'll throw down to anyone who doesn't look like a narc.) I've been having amnesia lately, so don't get weirded out if I don't remember sending this message.

01/29/97 16:12 <Timmy>
Dear Mom: I think Dad is right. Challenging the eRADicaTor's awesome power just isn't worth the risk. I will be available until 20:00. Let me know if you need any help unloading the car.

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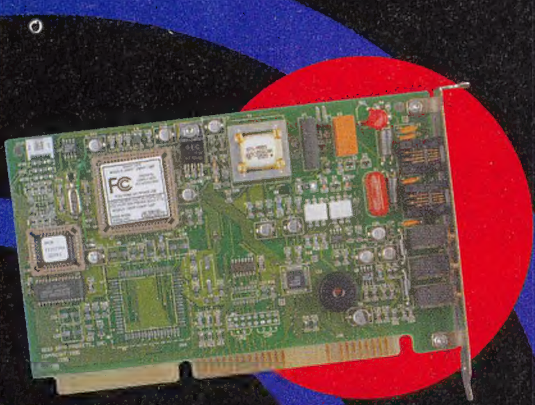

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